SERVICE MANUAL
OSCILLOSCOPE
MODEL DSS6520A

Kikusui
INTERNATIONAL CORP.

SERVICE MANUAL

DIGITAL STORAGE OSCILLOSCOPE

MODEL DSS6520A

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1. GENERAL

Model DSS6520A Digital Storage Oscilloscope has both analog oscilloscope functions and storage oscilloscope functions.

When in the analog mode (hereafter, referred to as REAL mode), the oscilloscope operates as a analog oscilloscope with a bandwidth of 20 MHz.

When in the storage mode, the oscilloscope operates with a digital storage function different from the conventional analog storage oscilloscope which employs a storage-type CRT, but the operation method remains basically the same.

The analog input signal is converted into a digital signal by an A/D converter at a speed of 500 nsec and the digital signal is stored in 1024-word digital memory.

The storage display operation is selectable between the auto erase mode and the roll mode. The storage display time is adjsutable. A pretrigger function is incorporated to display waveforms before triggering. The set value for this mode of operation denotes the amount written after triggering. This amount is adjustable up to 9.9 DIV.

The stored memory can be protected. An analog signal is provided to prepare a hard copy of the stored signal. A digital signal also is provided for data processing. A function to measure the amplitude and time of span between two points indicated by the cursors also is provided.

The digital storage oscilloscope is capable of capturing, reproducing and analyzing an instantaneous one-shot transiential signal. The stored waveform signal can be reproduced on the CRT for any required period of time. When used being connected to a computer, the oscilloscope can be used for various purposes.

2. SPECIFICATIONS

CRT

Type:	6-inch rectangular CRT, with internal graticule
Phosphor:	P31
Acceleration voltage:	Approx. 2 kV
Effective screen size:	10 DIV × 8 DIV (10 mm/DIV)
Blanking:	DC coupling
Graticule illumination:	Continuously variable

Operation modes
- o REAL
- o REAL & STORAGE
- o STORAGE

REAL mode

Vertical axis

Sensitivity:	5 mV - 10 V/DIV, 1-2-5 sequence
MAG ×5:	1 mV - 2 V/DIV
Sensitivity accuracy:	±5% or better (at CAL'D position)
Continuously-variable sensitivity adjustment:	Continuously variable covering between two adjoining ranges
Frequency bandwidth:	DC: DC - 20 MHz (with reference to 50 kHz)
	AC: 2Hz - 20 MHz (within -3 dB)
(MAG ×5:	10 MHz)
Rise time:	Approx. 17.5 nsec (Approx. 35 nsec when MAG × 5)
Input impedance:	1 MΩ ±2%, 33 pF ±2 pF
Input terminals:	BNC-type receptacles

Maximum allowable input voltage:	600 Vp-p (DC + AC peak; AC component not higher than 1 kHz)
	400 Vp-p for 5, 10, 20, 50 mV/DIV ranges and 0.1, 0.2 V/DIV ranges.
Input coupling:	AC, GND, DC
Base-line shift caused by range switching:	±0.5 DIV (including DC balance shift)
	±2 DIV when MAG ×5
Linearity:	Vertical amplitude ±0.1 DIV or better when a signal with 4 DIV amplitude at the CRT screen center is moved vertically within the effective screen range.

Vertical-axis operation modes

CH1:	Single channel
DUAL:	CHOP, 0.5 sec - 1 msec
	ALT, 0.5 msec - 0.2 μsec
	(Linked to TIME/DIV switch)
X-Y:	CH1 for X-axis, CH2 for Y-axis
CH2:	Single channel
Chop frequency:	Approx. 200 kHz

Triggering

Sweep modes:		AUTO/NORMAL/SINGLE		
Trigger source:		INT/LINE/EXT		
Internal trigger:		CH1/CH2		
Sensitivity	DC:	DC - 10 MHz	0.6 DIV	When in AUTO or NORMAL mode
		DC - 20 MHz	1 DIV	
	AC:	2 Hz - 10 MHz	0.6 DIV	
		2 Hz - 20 MHz	1 DIV	
External trigger sensitivity				
	DC:	DC - 20 MHz	0.5 V	
	AC:	2 Hz - 20 MHz	0.5 V	

Polarity:	"+" or "-"
Coupling:	AC or DC
EXT trigger	
Input impedance:	Approx. 1 MΩ
Maximum allowable input voltage:	100 Vp-p (DC + AC peak; AC component not higher than 1 kHz)
Input terminal:	BNC-type receptacle

Horizontal axis (time base)

Sweep time ranges:	0.5 sec/DIV - 0.2 μsec/DIV, 1-2-5 sequence
Continuously-variable adjustment of sweep time:	Covering up to 2.5 times or over of the value indicated by TIME/DIV switch
Sweep magnification:	5 times
X-Y mode:	CH1 for X-axis input
X-axis frequency bandwidth	
DC:	DC - 1 MHz (with reference to 50 kHz, 8 DIV)
AC:	2 Hz - 1 MHz (-3 dB)
X-Y phase difference:	Within 3° (at 50 kHz)

STORAGE mode

Vertical axis

Sensitivity:	5 mV - 10 V/DIV, 1-2-5 sequence
A/D converter:	8-bit (256) sequential comparator type
Conversion speed (frequency bandwidth):	500 nsec
Chop frequency for DUAL mode:	200 kHz (for writing)
DC offset:	Provided (approximately twice of graticule range)
Others:	See the items for REAL mode.

Triggering

See the items for REAL mode. (The signals are supplied from those of the REAL mode. The maximum frequency is 200 kHz.)

Horizontal axis (time base)

Sweep time ranges: 5 sec/DIV - 50 µsec/DIV

Highest sampling time when in single-channel mode: 500 nsec

Highest sampling time per channel when in DUAL mode: 1 µsec

Memory capacity: 8 × 1024

When in single-channel mode: 10 bits 1024 words

When in DUAL mode: 9 bits 512 words

Others: See the items for the REAL mode.

Sweep modes: AUTO ERASE

ROLL

PREDELAY (ROLL)

TRIG POINT

Amount written after trigger point: Approx. 0.1 DIV - 9.9 DIV, in 0.1-DIV steps

View time: Approx. 0.5 sec - 5 sec
(when the knob is pulled out)

Memory protect: HALF, HALF

When in single-channel mode: Sequentially continuing points are protected alternately, for independent-channel protect or dual-channel protect.

When in DUAL mode: Can be protected indepently for each channel.

PEN outputs

Vertical axis: CH1 and CH2, 1 V/DIV, 4 V to -4 V

Horizontal axis: 1 V/DIV, 0 to 10 V

Sync signal:	TTL level
Read signal:	By TIME/DIV

Z axis

Coupling:	DC coupling
Sensitivity:	Discernible intensity modulation by 3 Vp-p input
Frequency bandwidth:	DC to 5 MHz
Polarity:	Darkening by positive input
Input resistance:	Approx. 10 kΩ
Input terminal:	BNC-type receptacle

Calibration voltage

Waveform:	Positive square wave
Output voltage:	1 Vp-p, ±5%
Frequency:	1 kHz, ±25%
Duty ratio:	Within 45:55

Power supply

Line voltage:	Selectable A: 90 - 110 V B: 104 - 126 V C: 194 - 236 V D: 207 - 253 V
Frequency:	50/60 Hz
Power consumption:	Approx. 100 VA (with line voltage 100 V)

Dimensions and weight

External dimensions:	310 W × 150 H × 400 D mm (12.2 W × 5.9 H × 15.7 D in.)

Maximum dimensions:	370 W × 190 H × 465 D mm (14.6 W × 7.5 H × 18.3 D in.)
Weight:	Approx. 12 kg (26 lbs)

Ambient conditions

Normal operating conditions:	5 to 35°C (41 to 95°F), 80% RH
Operable limit conditions:	0 to 40°C (32 to 104°F), 85% RH

3. CIRCUIT DESCRIPTION

3.1 General

The Digital Storage Oscilloscope is comprised of a vertical deflection circuit, a horizontal deflection circuit, a digital storage circuit to store waveform data, a CRT circuit to drive the cathode-ray tube, a CAL circuit to calibrate the probe, and a power supply to provide supply voltages to the various circuits of the oscilloscope.

The vertical deflection circuit is comprised of two mutually independent input amplifiers (CH1 & CH2), a channel selector, and an output amplifier. The preamplifiers amplify or attenuate respective input signals. The output signals of the preamplifiers are fed to the channel selector circuit, to the trigger circuit for controlling the sweep generator for horizontal deflection, and to the digital storage circuit for A/D conversion and data storage.

The vertical channel selector selects the output signals of the vertical preamplifiers or those of the digital storage circuit. The selected signal is fed to the vertical output amplifier which amplifies the signal to a level sufficient for vertically driving the CRT beam.

The horizontal deflection circuit has a trigger generator, a sweep generator, a horizontal mode selector, and a horizontal output amplifier. The trigger generator produces a trigger pulse signal being driven by the internal trigger signal received from CH1 or CH2 preamplifier or by the external trigger signal fed via the external trigger signal input terminal. The sweep generator produces a sawtooth signal with which to seeep horizontally the CRT beam, being driven with the trigger signal or by spontatneously oscillating without any trigger signal when in the AUTO mode.

The horizontal mode selector selects a signal for horizontally driving the CRT beam. It selects the sweep signal for the regular oscilloscope mode, the sweep signal for the storage mode, or the

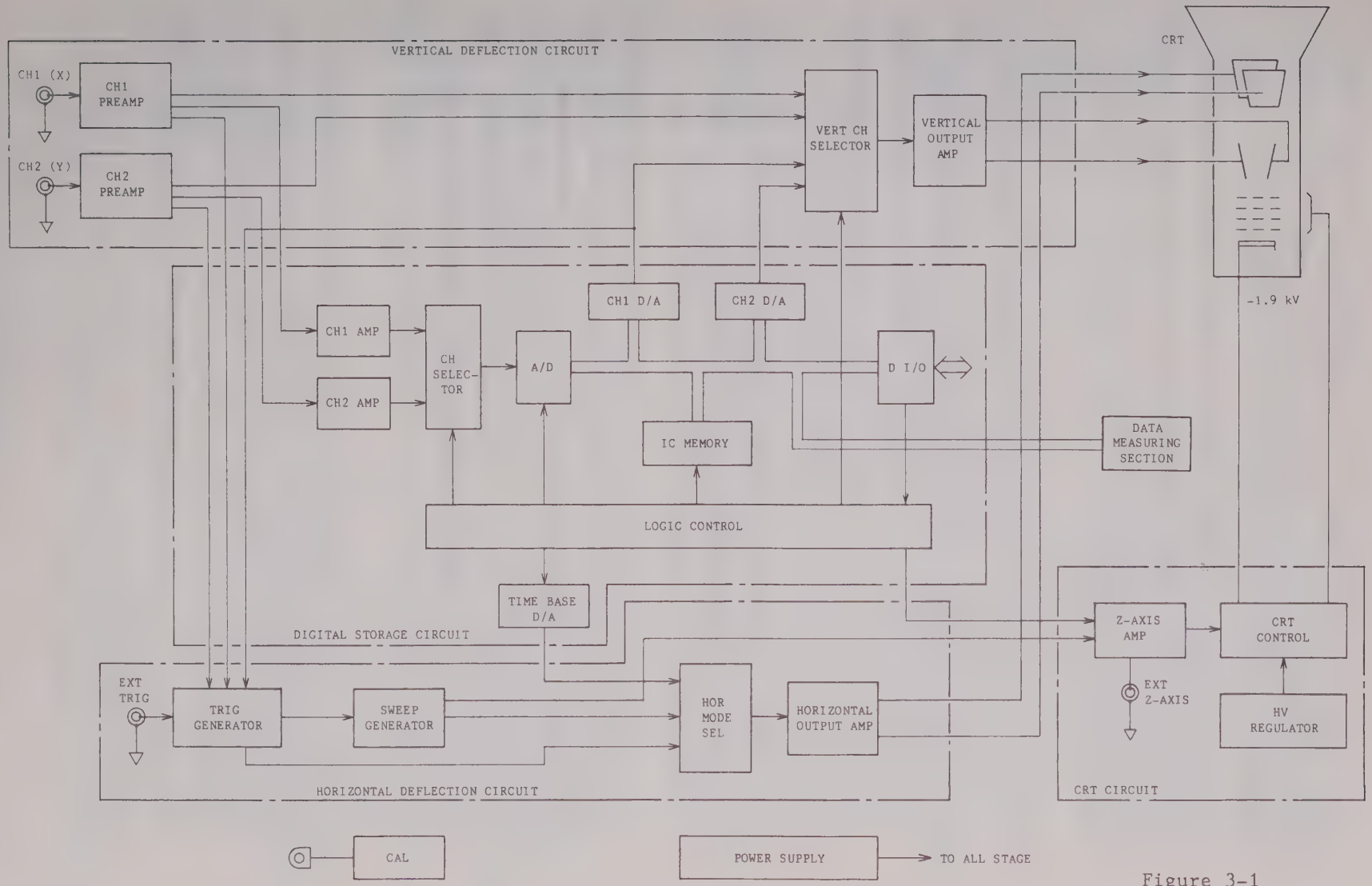

VERTICAL DEFLECTION CIRCUIT
CH1 (X)
CH1 PREAMP
CH2 (Y)
CH2 PREAMP
VERT CH SELECTOR
VERTICAL OUTPUT AMP
CRT
-1.9 kV
CH1 D/A
CH2 D/A
CH1 AMP
CH2 AMP
CH SELEC-TOR
A/D
D I/O
IC MEMORY
DATA MEASURING SECTION
LOGIC CONTROL
TIME BASE D/A
DIGITAL STORAGE CIRCUIT
Z-AXIS AMP
CRT CONTROL
EXT Z-AXIS
HV REGULATOR
EXT TRIG
TRIG GENERATOR
SWEEP GENERATOR
HOR MODE SEL
HORIZONTAL OUTPUT AMP
HORIZONTAL DEFLECTION CIRCUIT
CRT CIRCUIT
CAL
POWER SUPPLY
TO ALL STAGE

Figure 3-1

X-axis signal for the X-Y mode. The selected signal is fed to the horizontal output amplifier which amplifies the signal to a level sufficient for horizontally driving the CRT beam.

The digital storage circuit is comprised of CH1 and CH2 vertical signal amplifiers, a channel selector, an A/D converter, an IC memory, a digital I/O, CH1 and CH2 D/A converters, a logic control circuit, and a time-base D/A converter.

The two vertical signal amplifiers accept the output signals of respective channels of preamplifiers and amplifies them to a level sufficient for A/D conversion. The amplified signals are fed to the channel selector which is an analog switching circuit. The signal selected is fed to the A/D converter. The A/D converter converts the analog input signal into a digital output signal (binary coded signal), with resolution 8 bits and the maximum sampling speed 400 nsec.

The IC memory stores the A/D-converted data. It has a memory area of 8k bits (8 bits × 1024 addresses). Memory addressing (for address 0 to address 1023) is dictated by the logic control circuit.

The digital I/O is for input/output operations for the data stored in the IC memory and for remote-controlling some of the panel-controlled items using an external device (such as IF01-DSS). The CH1 and CH2 D/A converters converts the digital data stored in the IC memory back into analog signals in order to be displayed on the CRT screen. The analog signals are applied to the vertical channel selector which feeds these signal to the vertical output amplifier when in the storage mode.

The logic control circuit dictates the operations of the various selector circuits. When in the storage mode, it controls the logic operations of the various stages of the digital storage circuit. The time-base D/A converter provides a sweep signal for the storage mode of operation. This signal is synchronized with the vertical DA converter output signal.

The CRT circuit is comprised of a Z-axis amplifier, a high voltage generator, and a CRT control circuit. The Z-axis amplifier amplifies the blanking signal received from the sweep generator. The amplified signal is applied via the CRT control circuit to the CRT so that the return traces are blanked out. The high voltage generator produces a high negative voltage of approximately -1900 V which is applied to the CRT cathode. The CRT control circuit controls the CRT grid voltage so that the input signal is displayed in an easily observable pattern on the CRT screen.

3.2 Preamplifiers (Schematic Diagram ◇1◇)

The CH1 preamplifier amplifies the CH1 or X-axis input signal and the CH2 preamplifier amplifies the CH2 or Y-axis input signal.

- o Input Mode Selector Switch

  The input mode selector selects the input signal coupling mode (AC, GND, or DC coupling). When the GND mode is selected, the input circuit of the preamplifier is connected to the common line and disconnected from the input terminal.

- o Attenuator

  The attenuator attenuates the input signal to a level suitable for application to the input circuit of the amplifier. It has attenuation steps of 1/1, 1/10, 1/100, and 1/1000. These steps are selected by the VOLTS/DIV switch on the front panel.

- o Impedance Converter

  The impedance converter has an FET source follower (Q1) which presents a high input impedance and an emitter follower (U1-1/2) which provides a low output impedance to drive the differential amplifier of the next stage.

- o 1st Differential Cascade Amplifier

  The 1st cascade amplifier is comprised of a differential current amplifier (U1-2/2) and a current-to-voltage converter (Q2, Q3, Q4

and Q5). This cascade amplifier has an amplifier gain selector circuit which is selected being linked with the input attenuator by the VOLTS/DIV switch, a VARIABLE circuit to continuously vary the amplifier gain, and a ×5 MAG circuit to magnify the vertical sensitivity by 5 times.

The gain selector circuit selects the emitter resistors of U1-2/2 to select the gain of the current amplifier for 1 time, 2 times, or 4 times. The VARIABLE circuit controls the collector current of U1-2/2 so that the vertical sensitivity is continuously variable to a ratio of 1/2.5 or more. The ×5 MAG circuit selects the collector resistors of Q2 and Q3 so that the gain is magnified by 5 times.

The output signal of the current amplifier is branched off for the digital storage circuit.

o 2nd Differential Cascade Amplifier ◇2

The 2nd differencial cascade amplifier (U1, Q1, Q2/U2, Q3, Q4) amplifies the output signal of the 1st differential cascade amplifier to a level sufficient to drive the vertical signal switching circuit of the next stage. This amplifier has the vertical POSITION potentiometer for vertical positioning of the trace on the CRT screen. The potentiometer is connected in the collector circuit of the current amplifier. The amplifier gain is set by RV3/RV5.

Channel selection is made by feeding or not feeding the current of the channel switching circuit to the diode gate circuit which is connected to the collectors of the base-grounded transistors (Q1, Q2/Q3, Q4).

o Trigger Signal Circuit

The trigger signal circuit is comprised of U1/U2. The input signal for the trigger signal circuit is branched off from the output circuit of the 1st differential cascade amplifier. The trigger signal outputs are delivered from the collectors of respective transistors. The gain of the amplifier is controlled by RV2/RV4.

o CH1 Signal Output Amplifier

This amplifier is comprised of Q15, Q16 and Q17. The input signal for this amplifier is branched off from the same point with that for trigger signal. The output signal is delivered to the output terminal on the rear panel.

3.3 Vertical Channel Selector (Vertical Switching Circuit) ◇2

The vertical channel selector is comprised of a diode gate circuit (CR1 - CR16). When in the REAL mode, the circuit switches the output signals of the CH1 and CH2 preamplifiers; when in the STORAGE mode, the circuit selects the output signals of the CH1 and CH2 D/A converters. The selected signal or the switched signals are fed to the vertical output amplifier.

The switching actions are controlled by the logic circuit (U7 - U10, Q18 - Q21) as dictated by the vertical MODE switch (CH1, DUAL, X-Y, CH2) and the DISPLAY mode switch (REAL, STORAGE, and others).

3.4 Vertical Output Amplifier ◇2

The vertical output amplifier amplifies the input signal to a level sufficient for driving the vertical deflection plates of the CRT tube. The input signal received from the vertical channel selector is amplified by the feedback-type differential amplifier (Q13, Q14) and then power-amplified by the feedback-type differential amplifier (Q301 - Q310) to a lvel sufficient for driving the vertical deflection plates of the CRT tube.

3.5 Trigger Generator

The trigger generator is comprised of a trigger source selector circuit and a trigger generator circuit.

o Trigger Source Selector Circuit ◇2

The trigger source selector circuit has a function of selecting either CH1 or CH2 signal for the trigger source signal and a function

of selecting the X-axis signal for the X-Y mode of operation. The switching actions are controlled by the logic control circuit (U10, U11, Q22 - Q27, CR19 - CR21) as dictated by the vertical MODE switch and the INT TRIG switch. The selected signal is fed to the trigger generator circuit of the next stage.

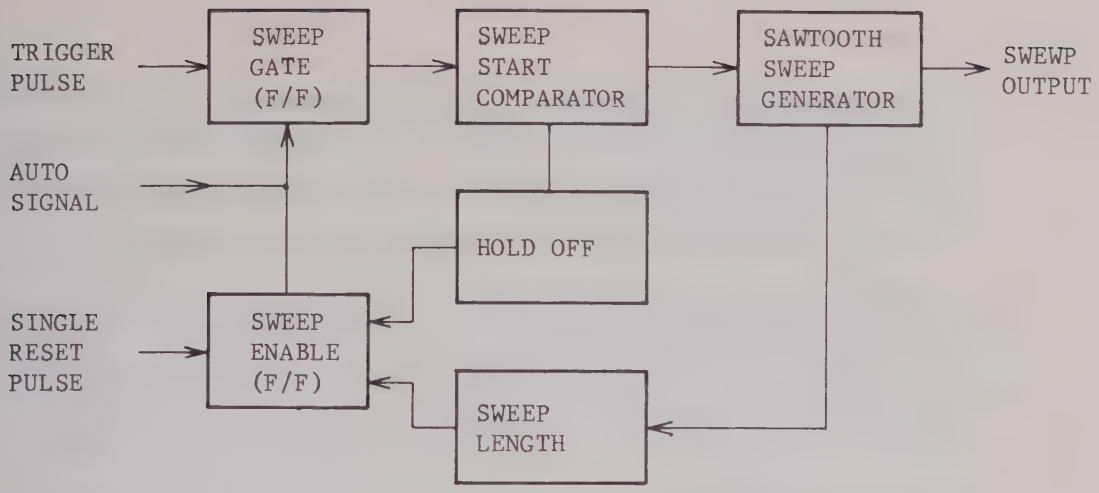
o Trigger Generator Circuit

The signal selected by the trigger source selector circuit is converted into a voltage signal by Q401 and fed via the triggering switch to the source follower (Q403). The signal is then fed via the triggering signal polarity selector circuit and triggering level setting circuit (Q404, Q405) to the level shift circuit (Q406, Q407) in order to be converted into a TTL level signal. The TTL level signal is fed to the wave shaping circuit consisting of a NAND circuit (U11) in order to be conditioned into a pulse signal with which to drive the sweep generator.

3.6 Sweep Generator ◇3◇

The sweep generator produces a sawtooth signal with which to deflect horizontally the beam spot on the CRT screen to provide a time base.

The sweep generator is comprised of a sweep gate circuit which receives the triggering signal from the trigger generator and generates the signal for starting the sweep, a sweep start comparator circuit which stabilizes the starting point of the sweep, a sawtooth generator circuit which produces a sawtooth signal with the time constant selected by the TIME/DIV switch, a sweep length circuit which controls the length of the sweep, a hold-off circuit which controls the sweep return and pause time, and a sweep enable circuit which controls the sweep gate circuit for the AUTO, NORM, or SINGLE mode as selected by the sweep mode switch.



o Sweep Gate

For the sweep gate, D-type positive-edge-triggered flip-flops with preset and clear functions (U12) are used.

The triggering pulse produced by the trigger generator is fed to the CLOCK terminal (Pin No. 11), the ENABLE signal of the SWEEP ENABLE circuit is fed to the PRESET terminal (Pin No. 10), and the ENABLE signal and the AUTO signal received via the SWEEP MODE switch are fed via the NAND gate circuit (U11) to the CLEAR terminal (Pin No. 13). The output signal of the Q terminal (Pin No. 9) is fed as a blanking signal to the Z-axis amplifier and as a start signal to the sweep start comparator circuit. The signal of the $\overline{Q}$ terminal (Pin No. 8) controls the CHOP signal for the vertical channel selector circuit.

If the AUTO mode is selected when no triggering pulse signal is applied to the CLOCK terminal, the CLEAR terminal is driven into the "L" state via the NAND gate circuit (U11) and the Q output becomes the "L" state. This causes the sweep circuit to run in the free-run mode.

o Sweep Start Comparator

The sweep start comparator (Q418, Q419) employs a differential amplifier. This circuit has a function of maintaining constant the sweep start level when no sweep gate signal is applied and CR412 and CR413 are off. The reference voltage signal which represents the start level is applied to one of the two input terminals of the differential amplifier and the output signal of the Miller integrator is applied to the other input terminal so that the difference between the two signal is compensated for.

o Sawtooth Generator

The sawtooth generator is comprised of a gate transistor, a Miller integrator, and an integrating time constant selector circuit which is dictated by the TIME/DIV switch.

The gate transistor (Q420) is driven by the start level control signal and controls the Miller integrator. The Miller integrator (Q423) generates a sawtooth wave. The integrating time constant is controlled with C433, C431, C432, and Q422. The constant current for integration is produced by U13 and Q424, being dictated by the TIME/DIV switch.

o Sweep Length Circuit

This circuit controls the length of sweep. The sawtooth signal is fed to the circuit consisting of R469, RV402, R471 and Q412. As Q412 conducts, the SWEEP ENABLE circuit is reset ($\overline{Q}$: "L" level).

o Hold-off Circuit

The hold-off circuit generates a signal for the hold-off time (pause time) that the sawtooth wave drops to the start level. The hold-off time circuit consists of an integrating circuit (C414, R477). The end of hold-off time is detected by Q414.

o SWEEP ENABLE Circuit

For the SWEEP ENABLE circuit, a flip-flop IC (U12) is used. The sweep length signal is applied to the PRESET terminal (Pin No. 1) and the hold-off signal is applied to the CLEAR terminal (Pin No. 1). The ENABLE signal is delivered from $\overline{Q}$ (Pin No. 6).

The ENABLE signal presets or clears the sweep gate circuit. When in the NORM sweep mode, since the AUTO signal is at the "L" level, the sweep gate circuit is in the ready state and waits for a triggering pulse. When in the SINGLE SWEEP mode, the hold-off circuit is kept in the idle state and the SWEEP ENABLE circuit is not cleared so that the one-shot sweep operation can be done.

3.7 Horizontal Mode Selector ◇3◇

The horizontal mode selector selects the output signals for the horizontal amplifier for the REAL mode, STORAGE mode, or X-Y mode of operation. Each of the input circuits consists of a base-grounded current amplifier (Q426 - Q428). Mode selection is accomplished by controlling the collectors of the transistors with the logic circuit (Q430 - Q432).

3.8 Horizontal Output Amplifier ◇3◇

The horizontal output amplifier amplifies the signal received from the horizontal mode selector circuit to a level sufficient for driving the horizontal deflection plates of the CRT. It has a horizontal POSITION circuit and a horizontal ×5 MAG circuit.

o Horizontal POSITION Circuit

This circuit controls horizontal positioning of the trace on the CRT screen by controlling the current added to the emitter current of the current-to-voltage converter (Q435).

o Horizontal ×5 MAG Circuit

This circuit has a horizontal ×5 MAG switch and a transistor switch (Q433). The horizontal sensitivity can be magnified by 5 times by changing the load resistance of transistor Q435 by turning it on and off.

o Output Amplifier

The output amplifier converts the input signal into a differential signal (Q501 - Q504) and amplifies it with the differential current amplifier (Q505 - Q508) to a level sufficient for driving the deflection plates of CRT.

3.9 Z-axis Amplifier ◈4

The Z-axis amplifier is comprised of an input circuit for mixing the control signal to drive the CRT intensity and an output amplifier for amplifying the conditioned signal to a level sufficiently high for driving the G1 grid of CRT.

o Input Circuit

The input circuit mixes the blanking signal received from the sweep generator, the external intensity modulation signal received via the Z-axis input terminal, the intensity modulation signal for the predelay triggering point when in the STORAGE mode (the circuit consisting of Q615, Q616, Q617), and the INTEN control signal for the basic intensity control of CRT. The mixed signal is fed to the output amplifier.

o Output Amplifier

The output amplifier is a feedback type amplifier (Q706, Q707) which amplifies the signal received from the input circuit to a level of several tens volts to drive the G1 grid of CRT.

3.10 CRT Control Circuit ◈4

The CRT control circuit is comprised of a DC regenerative circuit to convert the Z-axis amplifier output into a level of the operating voltage of CRT in order to be fed to the G1 grid of CRT, an astigmatism and a focus control circuit to provide appropriate voltages to respective electrodes of CRT so that sharp images are displayed on the CRT screen, a trace rotation circuit to align the displayed trace line with the graticule lines, and an illumination control circuit for the graticule.

3.11 High Voltage Generator (Regulator) ◈4

The high voltage generator produces an acceleration voltage (-1900 V) which is applied to the CRT cathode which emits free electrons for the electron beam. The high voltage generator is comprised of a blocking oscillator (Q704, Q705), making up a DC-DC converter. The oscillated voltage (approx. 25 kHz, 630 Vp-p) is tripple-voltage-rectified into a DC voltage of approximately -1.9 kV. The voltage of the DC-DC converter is fed back to the control circuit (Q701 - Q703) through a high resistance circuit (R721, R722) so that a stable high voltage is obtained.

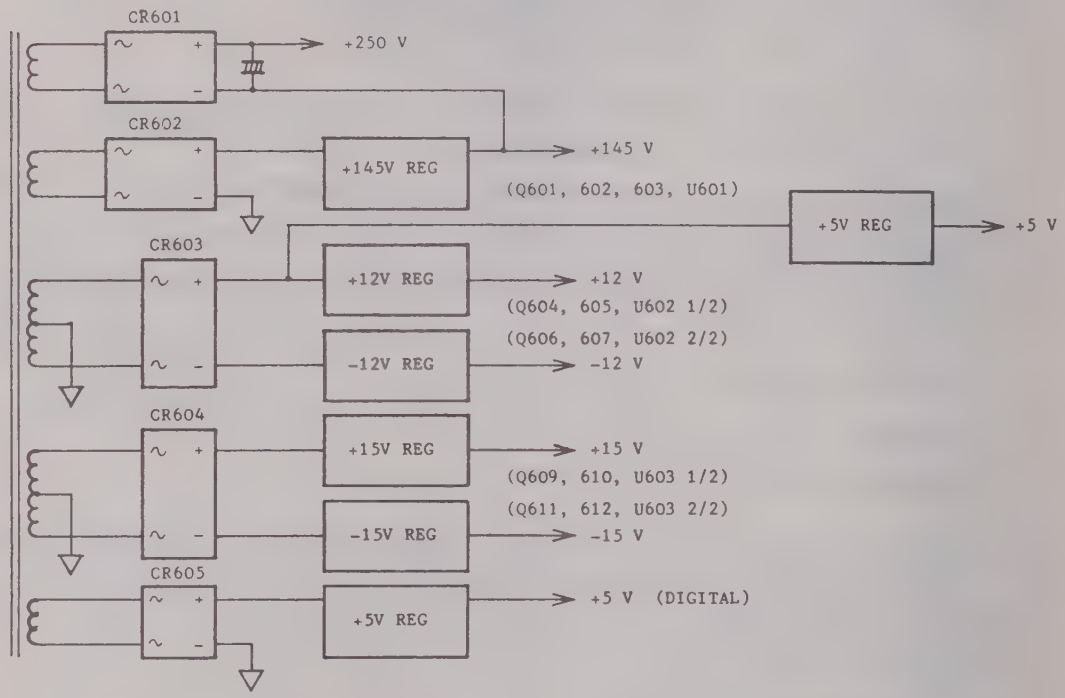
Part of the oscillated voltage is fed through the coupling capacitor (C706) to the DC regenerative circuit in order to be used as a switching signal for it.

3.12 Calibrator Circuit ◈2

The calibrator circuit generates a reference pulse voltage signal to calibrate the probe and the amplifiers when they are used in the UNCAL mode. The calibration signal is a square wave of 1 Vp-p ±5%, approximately 1 kHz. The calibration signal is generated by the multivibrator consisting of the NAND circuit of C-MOS IC (U5) and conditioned by the Schmitt circuit consisting of NAND circuits.

3.13 Power Supply

The power supply steps up or down the AC line voltage and rectifies the respective AC voltages into DC voltages to be supplied to the various circuits of the oscilloscope. The primary winding of the transformer has various taps so that the oscilloscope can be operated on the various line voltages. The secondary windings include the 6.3-V winding for the CRT heater and other windings for the DC supplies for the various circuits of the oscilloscope. The DC supplies are non-regulated +250 V, and regulated +125 V, +5 V, +12 V, -12 V, +15 V, and -15 V.



3.14 A/D Preamplifier ◇1

The preamplifier for the A/D converter receives the signal from the 1st cascade amplifier described in Section 3.2 and amplifies the signal to a level suitable for the A/D converter input. The preamplifier is comprised of an impedance converter for branching off the channel signals for A/D conversion, an adder circuit for adding the offset voltage, and an A/D amplifier to control the A/D conversion level.

o Impedance Converter

The impedance converter is an operational amplifier with high input impedance which causes very less loading effect on the preamplifier of the preceding stage.

o Offset Adder Circuit

This circuit adds a DC signal to the input signal so that the A/D conversion range can be effectively employed by cancelling the DC component when the DC component is superimposed on the input signal.

To superimpose the DC offset voltage, pull out the DC OFFSET switch and set the FET (Q6) switch to the ON state so that the offset voltage is applied to the adder (U3). The output signal of the adder is with a gain to provide a 1 Vp-p/8 DIV output.

o A/D Amplifier

The A/D amplifier consists of a normal phase amplifier (U4, Q7, Q8, Q9, Q10) for signal amplification. The output (TS3) is linear for a range of -3 V to +3 V.

3.15 A/D Channel Selector ◇1

The A/D channel selector selects the signal to be fed to the A/D converter. It consists of a transistor switching circuit (Q11, Q12, Q13, Q14, Q15). Its operation is controlled by the logic control circuit. When in the dual storage mode, on/off operations of up to 500 nsec can be done.

3.16 A/D Converter

The A/D converter employs a sequential comparation type of LSI (N6) of 8-bit 400-nsec/DATA. In the schematic diagram, it is indicated being separated into an analog section and a digital section. The data delivered is held in the data latch (M6).

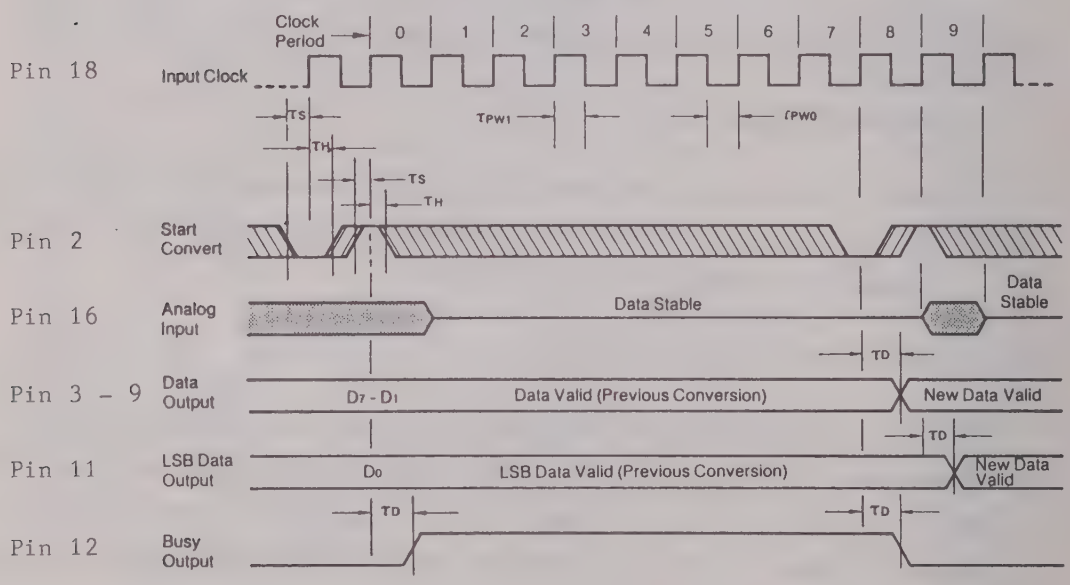
o Analog Section

For the analog section, the input signal (Pin No. 16) and supply voltages are indicated. For the supply voltages, the +5 V (Pin No. 1), -5 V (Pin No.17) from the -15 V line via a regulator, and -0.5 V (Pin No. 13) for V_{REF} are supplied with respect to the analog ground terminal (Pin No. 15).

o Digital Section

Logic signals for obtaining 8-bit digital data by operating the A/D converter are indicated. The timing is as illustrated in the timing diagram. The MSB of the output data is D7 and the LSB is D0.

Timing Diagram



o Data Latch Circuit

In order to hold the data delivered by the A/D converter, this circuit holds the data when the BUSY signal ($\overline{\downarrow}$) is received from the A/D converter. It sends out the data to the data bus line when commanded by the line driver (M7).

3.17 Memory Circuit

The memory circuit stores the data which has been A/D converted. It has a semiconductor memory device (NMOS STATIC RAM) (K7, L7) of 4 × 1024 bits. It accepts data from or sends data to the data bus line for data read/write ($\overline{WE}$) operation and address (A0 - A9) control operation for address setting. The data modes are as follows:

$\overline{WE}$	MODE
L	WRITE
H	READ

3.18 Logic Control Circuit

The logic control circuit is comprised of a clock oscillator which provides various clock signals for various timing operations, an address control section for read/write address setting, a view time control section for controlling the view time, a triggering point latch section to store the predelay triggering point, an automatic control section to control the automatic erase function, and a predelay stop circuit which dictates the period of predelay.

o Clock Oscillator

The clock oscillator generates a reference clock signal of 10 MHz to provide reference timing for the various logic control operations. The clock oscillator consists of an oscillating circuit, frequency dividers, and a clock selector.

The signal is generated by the NAND circuit (B2). Frequency divisions are done by C2, C3, D3, D2, and E1. The frequency-divided signals are encoded (B1) and selected (B3, D1) by the TIME/DIV switch so that the sampling clock signals are obtained.

o Address Control Section

The address control section is comprised of a write address counter and a read address counter for access to data stored in IC memory, and an address selector and an address adder for predelay.

The write address counter produces a write address for storing the data of A/D converter in the IC memory. It employs synchronous up/down dual clock counters (I8, I9, I10). The write address bus is WA9 - WA0.

The write address counter produces a read address for delivering the data of D/A converter to the IC memory. It employs synchronous up/down dual clock counters (E11, F11, G11). The read address bus is RA9 - RA0.

The address adder (F8, F9, F10) is used for data re-arrangement when in the predelay mode. At the end of predelay, the stop address of the write address counter is held and the WA and RA data are added to accomplish re-arrangement (relative address). The predelay address is FA9 - FA0.

The address selector (◇7◇, K10, L9, K9, L8, K8) selects the address input (A9 - A0) of IC memory to which the corresponding data is to be fed.

o View Time Control ◇5◇

The view time control circuit forcefully provides a period (0.5 - 5 sec) during which no trigger pulse is accepted. This period signal is generated by the timer IC (A1), employing the time-constant signal of the CR circuit. The view time signal is fed to the sweep generator ◇3◇ and it drives Q417 to the on state so that no trigger pulse is accepted.

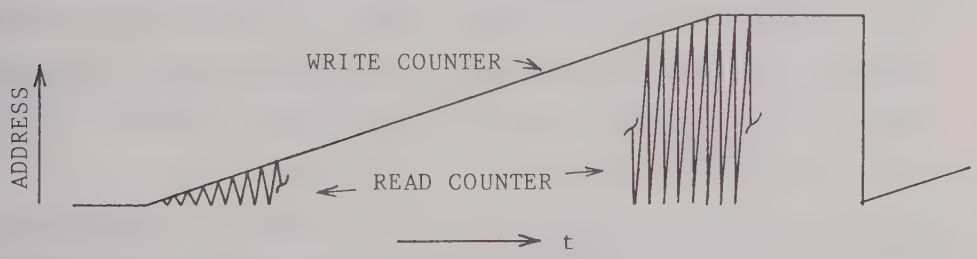
o Trigger Point Latch Circuit ◈6

The trigger point latch circuit memorizes the address of the initial trigger when data is stored in the predelay mode. This information is used to indicate the triggering point when reading the data.

The trigger point latch circuit is comprised of a trigger address circuit and an address comparator cicuit. The trigger address circuit (D10, D9, D8) stores the write address data (WA9 - WA0) with the "$\overline{\text{TRIG}}$" pulse signal received from the trigger generator. The address comparator circuit (G8, G9, G10) compares the read address data (FA9 - FA0) with the trigger address when in the predelay mode and, if they coincide, applies an intensity modulation signal to the CRT.

o Auto Erase Control Circuit ◈6

The auto crase control circuit is for repetition of high speed read of data up to the write address, different from other read modes.



The auto erase control circuit has a comparator (F10, F9, F8) to compare the write address with the read address. When they have coincided, the read counter is set to the down counter. When the value of the read counter has become all zero, it is set to the up counter. These operations are made at a fast speed (2 μsec/DATA). The control operations are made by the flip-flop of NAND (D7, D8). The all-zero detection of the read counter is made by the NOR circuit (H8, H10).

o Predelay Stop Circuit ◇7

The predelay operation is made in such manner that memorizing stops when the data for the number of divisions preset by the digital switches of the trigger point after the application of the initial triggering pulse has been stored. The predelay stop circuit controls the end of the memorizing operation. It consists of a decade counter (E5, D4, D5) and a comparator (C4, C5). The digital switch data is applied to the A input of the comparator and the counter output is applied to the P input. When the two inputs have coincided, the memorizing operation stops. The trigger point digital switches are in the unit of [DIV] and conversion is made for 10 words per 0.1 DIV. The decade counter counts up each time a triggering pulse is applied.

3.19 D/A Converters ◇7

The D/A converter converts the digital data which has been stored in the IC memory into an analog signal. One converter is provided for each of the CH1 and CH2 channels.

The D/A converts the digital data held in the data latch IC (L6 for CH1 or K6 for CH2) into an analog current signal with the 8-bit D/A converter LSI (L5 for CH1 or K5 for CH2), and converts the current signal into a voltage signal with the current-to-voltage converter (L4 for CH1 or K4 for CH2).

When in the single channel mode (CH1 or CH2), both channels of D/A converters handle the same data and deliver the same signal.

3.20 D/A Amplifier

The D/A amplifier is comprised of a D/A amplifier for driving the vertical deflection amplifier and a pen output amplifier which provides a pen output signal.

o Vertical-deflection D/A Amplifiers ⑦, ②

The vertical-deflection D/A amplifier of the CH1 channel alone is explained here, since that of the CH2 channel is identical.

The output signal of the D/A converter is impedance-converted by the impedance follower (M3), fed to the CH1 DATA OUT circuit of ②, converted into a differential signal by transistors Q9 and Q10, and the differential signal is amplified by the differential cascade amplifier (U4, Q11, Q12) and fed to the vertical selector circuit.

o Pen Output Amplifiers

The CH1 pen output amplifier alone is explained here.

The pen output amplifier amplifies the D/A converter output signal into a 1 V/DIV signal. This amplifier is a power amplifier consisting of M4, Q803, and Q804.

3.21 Time Base D/A Converter ⑥

The time base D/A converter converts the address data of the read address counter into a voltage signal in order to produce a sweep signal for the STORAGE mode. The signal is fed also to the time base signal terminal on the rear panel.

The D/A converter employs a 10-bit LSI (C10). The current signal is converted into a voltage signal (±25 V) by the current-to-voltage converter (A10). The converted voltage signal is fed via the horizontal mode selector to the horizontal amplifier. Then the signal is impedance-converted by the impedance converter (A11, Q802) and fed as an output signal (0 - 10 V) to the TIME BASE terminal.

3.22 Digital I/O Circuit

The digital I/O circuit has a 50-pin connector on the rear panel of the oscilloscope for connection with an external instrument (IF01-DSS for Kikusui instrument). For data transfer with the IC memory, a bidirectional bus is used. The I/O circuit is connected to the bus line via tri-state buffers (K11, L11).

3.23 Data Measuring Section

The data measuring section processes the stored data and the voltage range switch information and time range switch information with its CPU and displays the voltage or time between cursor positions. The data measuring section consists of a cursor section, a processing section, and a display section.

o Cursor Section ◈8◈

The cursor section selects the required data to be fed to the processing section. At the same time, it generates an intensity modulation signal to intensify the CRT screen.

Two cursor switches are provided on the front panel. The signal of the switch for cursor 1 is fed to the F/F of G2 to generate a clock pulse signal. The clock pulse is fed to counters E1 - E3 to store the address of cursor 1. If the cursor switch is held pressed to the right or left position for a certain period, counter F4 starts operating and cursor addresses are sent at a rapid speed. Digital comparators D1 - D3 are provided to compare the stored and held cursor address with the data read address (RA0 - RA9). When the address has coincided, a pulse signal for cursor 1 is generated.

The signal of the switch for cursor 2 is fed to the F/F of G2. The address of cursor 2 is stored in counters B1 - B3.

To set the number of delay pulses for predelay, the switch for cursor 1 is used in common. In order to store the number of delay pulses, the delay data is held by counters A3 and B4.

o Processing Section ◈9◈

The processing section is comprised of a data input section and a CPU section. The data input section has an 8-bit input circuit for processing of a voltage signal and a 10-bit address data input circuit for measurement of time. One of the two circuits is selected by the selector (3F, 4F, 6F). The data is latched in the register (3E, 4E) with the coincidence signal of cursor 1 or in the register (3D, 4F) with the coincidence signal of cursor 2.

The above data is acquired into a port A and a portion of port B of PIO I (3A) and then fed to the CPU (6B) in order to be processed together with the range which is explained subsequently.

To measure the range and time, the VOLTS/DIV switch data and TIME/DIV switch data are sent to the CPU in a similar manner as above. The VOLTS/DIV data of channel 1 is fed via the inverter (1A) and encoder (1B) to the register (1E) and latched there; similarly, that of channel 2 is fed via the inverter (1A) and encoder (1C) to the register (1D) and latched there. The TIME/DIV data is latched in the register (1F). The range data is acquired into port A of PIO II (3C) and then transferred to the CPU (6B).

The data is processed by the CPU (6B) with the program ROM (6C). The RAM (6D) is used as processing work area. Processing is done on the voltage and time data inputs together with their range data, in a fixed-point processing system. Then, the processed data is converted for the required display range. The result is delivered to port B of PIO II (3C). (The processed data is D01 - D04.)

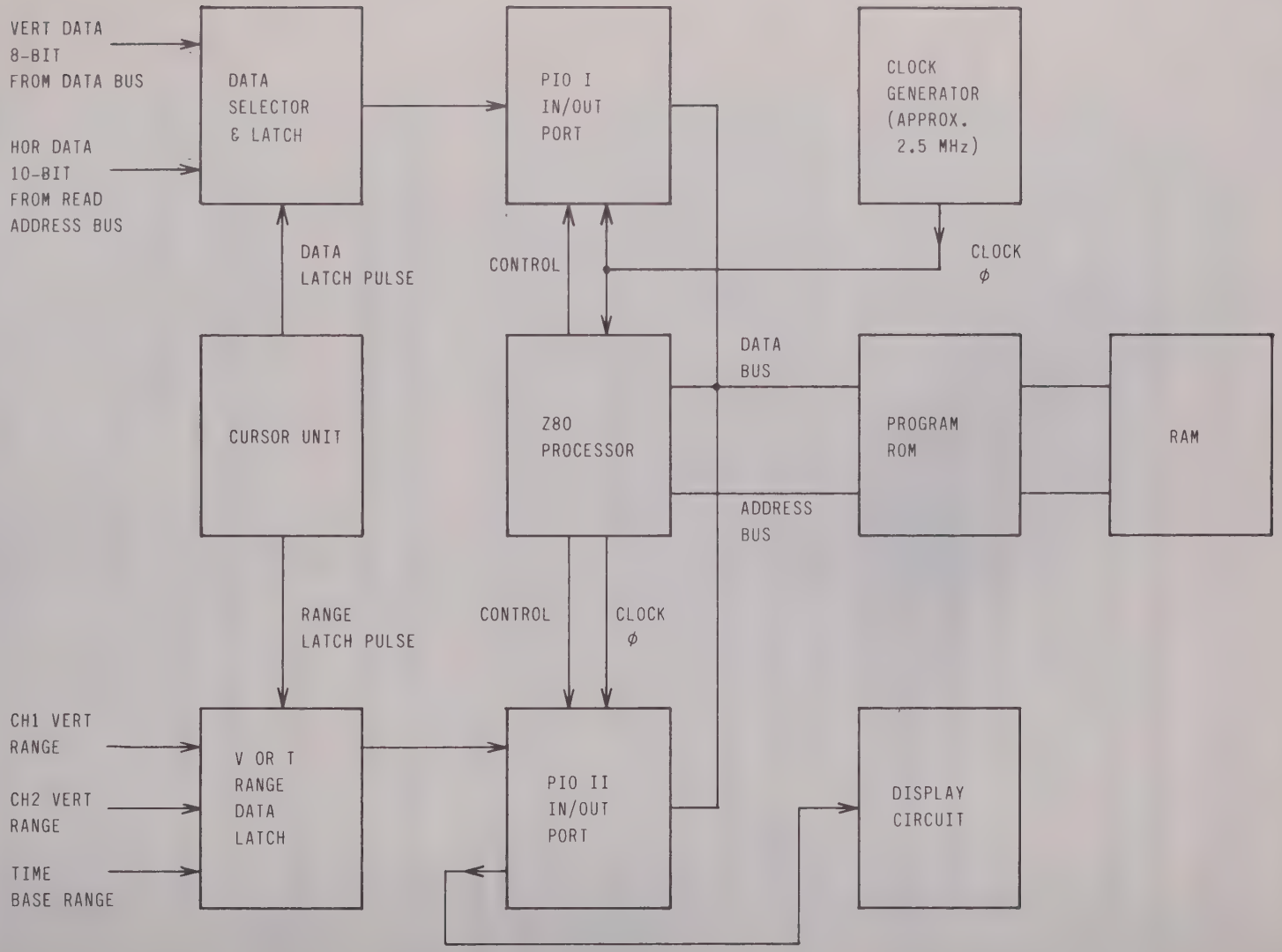
The clock frequency (ø) for the CPU is approximately 2.5 MHz. The processing time is approximately 120 msec and processing is continuously repeated.

When the record mode is REAL, the R (L) signal becomes "L", the clock stops, the CPU is reset, and processing stops.

o Display Section ◇10◇

The display section stores in its display shift register (9G, 9F, 9E, 9D) the processed data (D01 - D04) received from the CPU or the delay number data (PTP0 - PTP7) for predelay. The data processed by the CPU is stored in synchronization with the ISEL and R/W signals.

The stored data is used for dynamic drive of the display units via the 7-segment display LED driver (11G). The ring counter (9C) is used for dynamic drive of the display units. The unit of measure is displayed via the decoder, together with the U1 or U2 signal processed by the CPU.



Data Measuring Section Block Diagram

4. CALIBRATION

This section covers the check and calibration procedures for the DSS6520A. If calibrations are unattainable with these procedures, repair service is needed.

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Table of Calibration Instruments

Instrument	Accuracy	Use
1. Digital voltmeter	(1) Range: 0 to 20 V Accuracy: ±0.05% or better (2) Range: 0 to 2 kV Accuracy: ±1% or better	Adjustment of power supply
2. Capacitance meter (C-meter)	Range: 0 - 50 pF Accuracy: ±3% or better	Adjustment of input capacitance
3. Ohmmeter	Range: 0 to 2 MΩ Accuracy: ±0.5 or better	Check of input resistance
4. Universal counter	Range: 0 to 1 sec Accuracy: $\pm 10^{-5}$ or better	Check of clock and view time
5. Test oscillator or function generator	Range: 10 Hz to 10 kHz Accuracy: ±3% or better	Check of storage function
6. Oscilloscope	Bandwidth: DC to 100 MHz Maximum sensitivity: 5 V/DIV Accuracy: 3%	Adjustment of offset voltage
7. Voltage-axis calibrator	Oscillating waveform: Square wave Output voltage: 20 mVp-p to 50 Vp-p Accuracy: 1% or better (Example: TEKTRONIX TG506)	
8. Time marker generator	Accuracy: 1% or better (Example: TEKTRONIX TG501)	

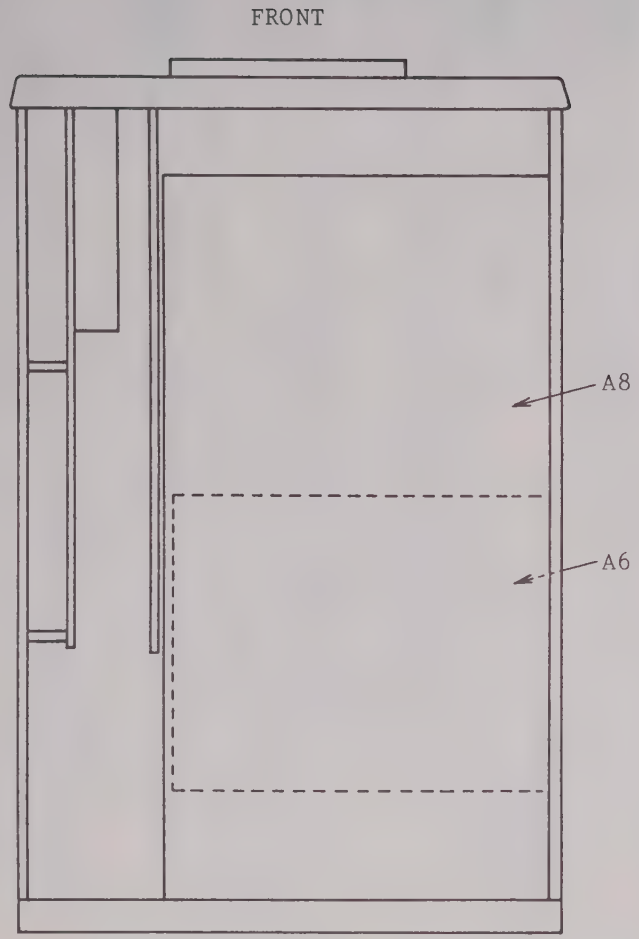


Figure 4-1 BOTTOM VIEW

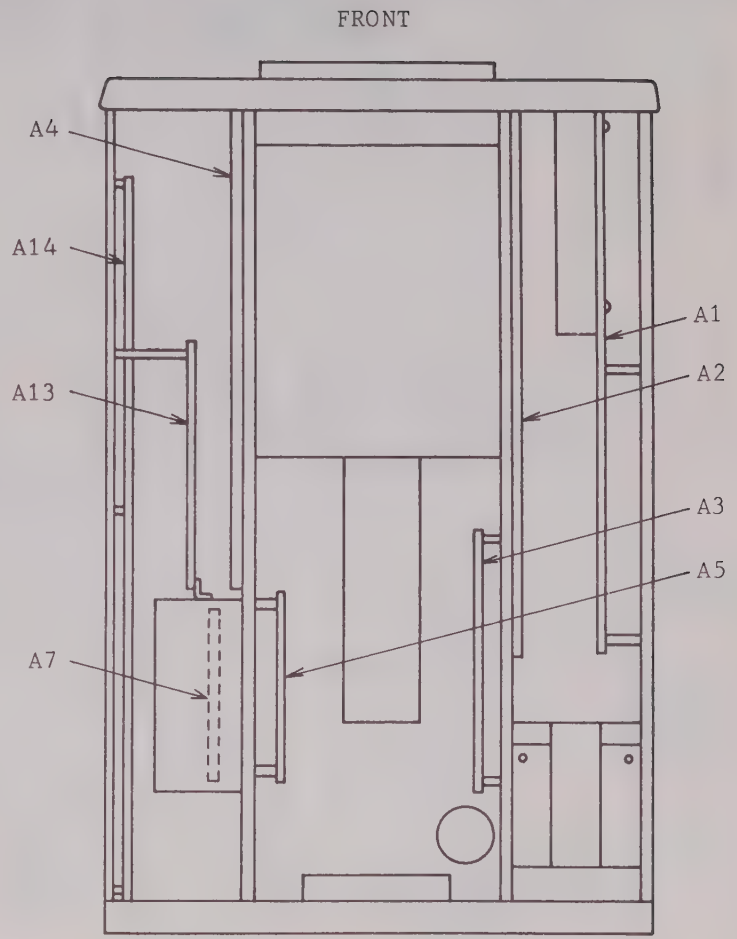


Figure 4-2 TOP VIEW

SERIAL NO. _ _ _ _ _ _ _ _ _ _

1. OUTVIEW and STRUCTURE

2. FUNCTIONS

INTEN	( )	CH1 POSITION	( )	TRIGGERING	( )
FOCUS	( )	REAL	( )	AC, DC	( )
ILLUM	( )	STRAGE	( )	+, -	( )
TRACE ROTATION	( )	DC OFFSET	( )	INT	( )
DISPLAY MODE	( )	CAL'D VAR	( )	LINE	( )
REAL	( )	AC, GND, DC	( )	EXT	( )
REAL & STRAGE	( )	MAG x 5	( )	LEVEL	( )
AUTO ERASE	( )	SIGNAL OUT	( )	VIEW TIME	( )
ROLL	( )	CH2 POSITION	( )	TRIG POINT	( )
PRE DELAY	( )	REAL	( )	TIME/DIV	
VERT MODE CH1	( )	STRAGE	( )	CAL'D VAR	( )
DUAL	( )	DC OFFSET	( )	READ TIME	( )
X-Y	( )	CAL'D VAR	( )	POSITION	( )
CH2	( )	AC, GND, DC	( )	CHOP, ALT	( )
INT TRIG CH1	( )	MAG x 5	( )	MAG x 5	( )
CH2	( )	SWEEP MODE		TIME BASE	( )
SCOPE, PEN	( )	AUTO	( )	SYNC	( )
PEN ATART	( )	NORM	( )	D I/O	( )
PEN OUT CH1	( )	SINGLE	( )	EXT CLOCK	( )
CH2	( )	MEMORY PROTECT CH1	( )		
Line voltage change	( )	CH2	( )		
Mesaring function		CURSOR 1	( )	CURSOR 2	( )
		Voltage measurement	V, mV		( )
		Time measurement	sec, msec, usec		( )

3. CHARACTERISTICS

VERTICAL

Sensitivity error ±5% or less REAL ( ) STORAGE ( )

At REAL mode (%)

VOLTS/DIV	5m	10m	20m	50m	0.5V	5V
CH1						
CH2						

At MAG x 5, 5 mV/DIV CH1 _ _ _ _ CH2 _ _ _ _

Sensitivity continuously variable

Continuosly variable between ranges. ( )

Frequency bandwidth DC DC - 20 MHz (At MAG x 5 DC - 10 MHz)

AC 2Hz - 20 MHz (At MAG x 5 2Hz - 10 MHz)

-3dB or less DC ( ) AC ( )

Input impedance 1 MΩ ± 2%, 33pF ± 2pF ( )

Trace shift caused by range switching ±0.5 DIV (±2 DIV when MAG x 5) (including DC balance shift)

Linearity Vertical amplitude 4 ± 0.1 DIV when a signal with 4 DIV amplitude at CRT screen center is moved vertically within the effective screen range. ( )

DC offset on STORAGE mode

Variable to approximately twice of graticule range ( )

TRIGGER

Sensitivity	Internal	DC	DC - 10 MHz	0.6 DIV	( )
			DC - 20 MHz	1.0 DIV	( )
		AC	2 Hz - 10 MHz	0.6 DIV	( )
			2 Hz - 20 MHz	1.0 DIV	( )
	External	DC	DC - 10 MHz	0.5 V	( )
		AC	2 Hz - 20 MHz	1.0 V	( )
EXT input impedance	Aporroximately 1 MΩ				( )

HORIZONTAL

Sweep time error +5% or less

S/DIV	0.2μ	0.5μ	1μ	2μ	5μ	10μ	1m	0.5
Error(%)								

Sweep time continuously variable
Variable to 2.5 times or over of the value indicated by TIME/DIV switch ( )

TRIG POINT Amount written after trigger point at PRE DELAY (ROLL) mode
Approximately 0.1 DIV - 9.9 DIV ( )

View time Approximately 0.5 sec - 5 sec ( )

X-Y mode X axis frequency bandwidth (50 kHz, 8 DIV reference)

DC	DC - 1 MHz	-3 dB or less	( )
AC	2 Hz - 1 MHz	-3 dB or less	( )
X-Y phase difference		3° or less at 50 kHz	( )

PEN output

Vertical axis	CH1 and CH2	1 V/DIV	+4 V - -4 V	( )
Horizontal axis		1 V/DIV	0 - 10 V	( )
Sync signal	TTL level			( )

Z axis

Sensitivity	Discernible intensity modulation by 3 Vp-p input	( )
Frequency bandwidth	DC - 5 MHz	( )
Input impedance	Approximately 10 kΩ	( )

Calibration voltage

Frequency	1 kHz ±25%	( )
Duty ratio	45 : 55 or less	( )
Output voltage	1 Vp-p ±5%, positive square wave	( )

Insulation Between line and chassis 500 V DC More than 30 MΩ ( )

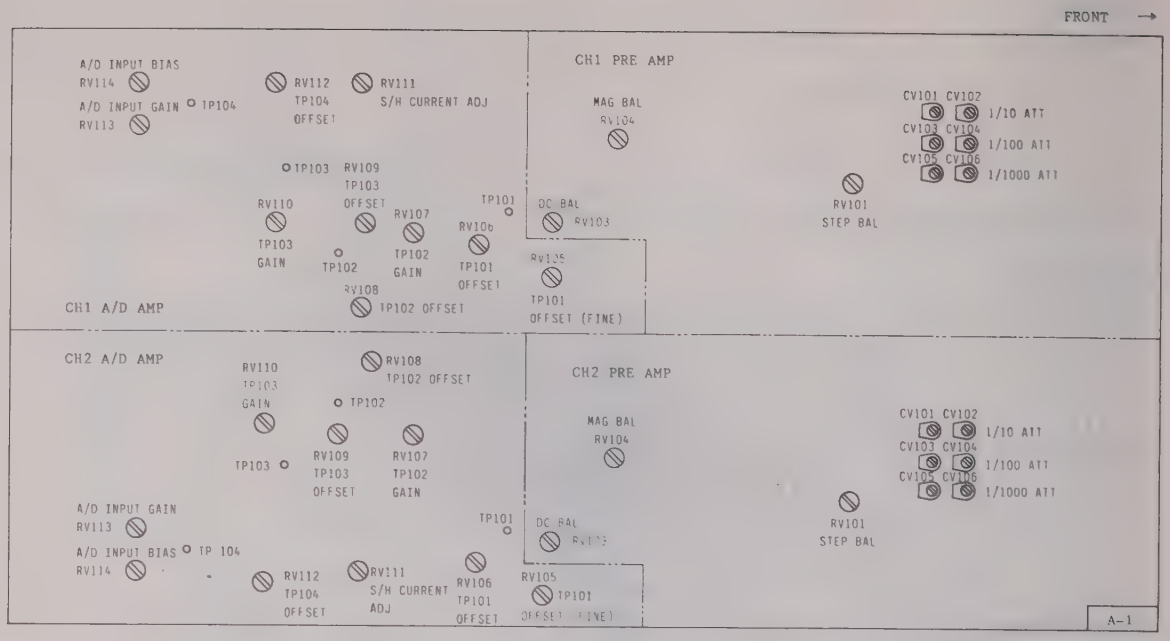
4. TEST CONDITION

Line voltage _ _ _ _ V, Line frequency 50 Hz, Power consumption _ _ _ _ VA

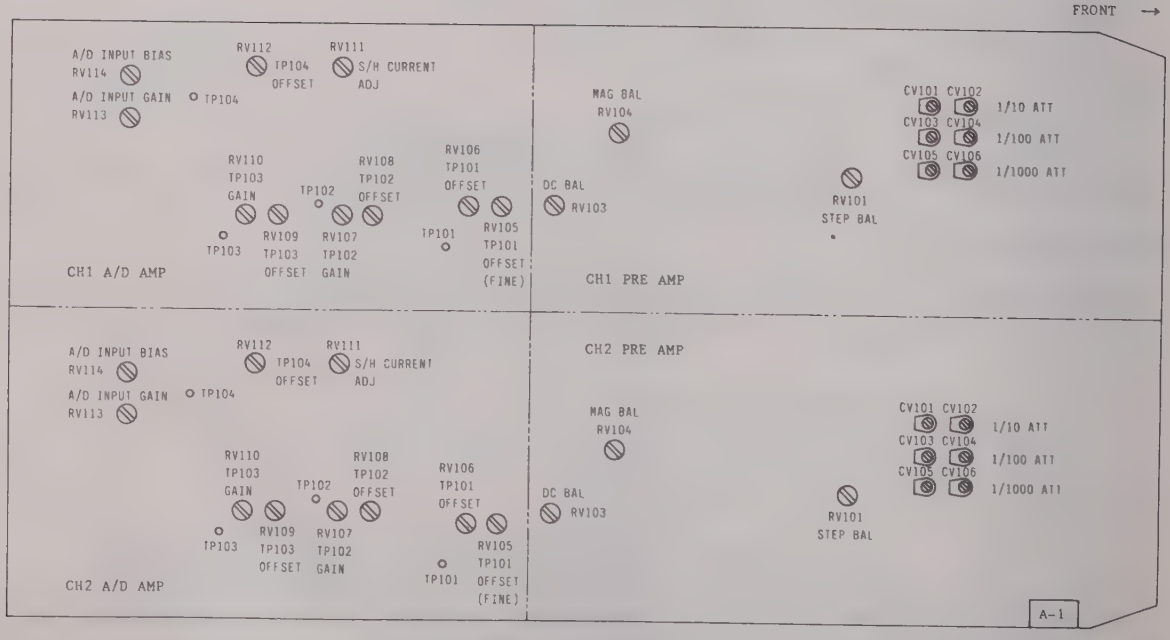
Date _ _ _ _ _ _ _ _ _ _ _ Temperature _ _ _ _ °C Humidity _ _ _ _ %

Test _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Inspection _ _ _ _ _ _ _ _ _ _ _ _ _ _ _



(Printed Circuits Side View)



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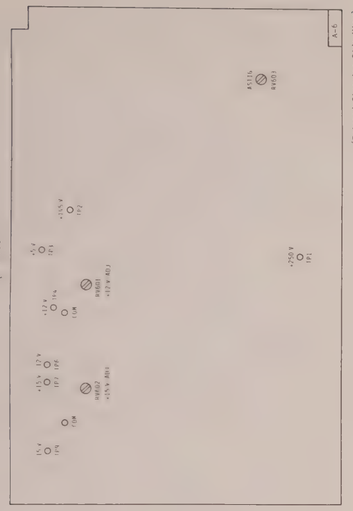
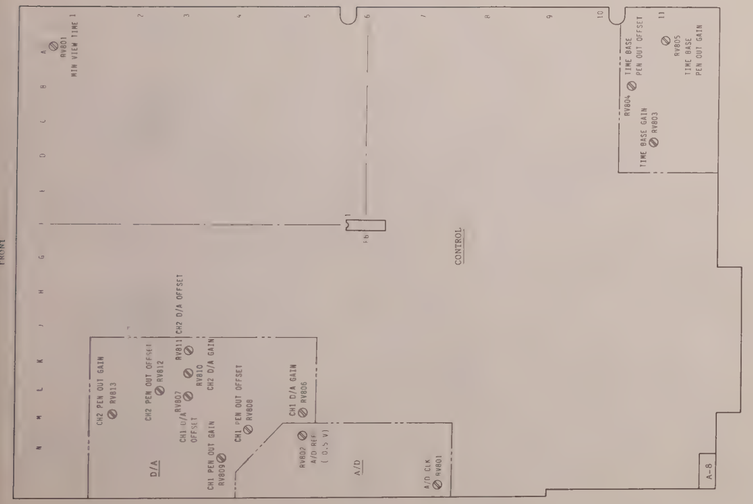
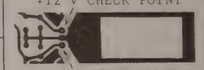
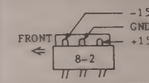
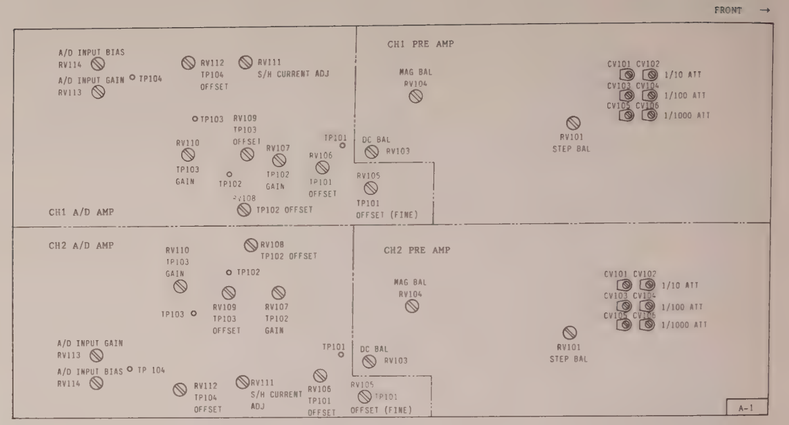




CHECK & CALIBRATION PROCEDURES

No.	ITEM	CONTROLS	PC BORAD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	POWER SUPPLY							
1	+5 V CHECK			DC voltmeter		Check output voltage at junction terminals (3P) on side of HV shielding case. +4.75 V – +5.25 V		Supply voltage for main board
2	+12 V ADJUST	RV601	A1			Adjust to +12 V. +11.88 V – +12.12 V		Check on PC board A1.
3	-12 V CHECK					-11.88 V – -12.12 V		
4	+15 V ADJUST	RV602	A8			Adjust to +15 V. +14.85 V – +15.15 V		Connector of PC board A8.
5	-15 V CHECK					-14.85 V – -15.15 V		
6	+5 V CHECK		A4			Check at Vcc pin of TTL IC. +4.85 V – +5.15 V		
7	+145 V CHECK		A6			Check at TP2 of A6. Approx. 145 V	Checking of these items may be omitted if the beam spot can be moved to outside of the screen with the VERT & HOR POSITION control when in X-Y mode.	
8	+260 V CHECK					Check at TP1 of A6. Approx. 260 V		
9	-1900 V CHECK		A7			Check at cathode (pin No. 2) of CRT.		TAKE CAUTION AGAINST HIGH VOLTAGE.
◎	CRT CIRCUIT							
10	INTEN				VERT MODE: X-Y CH1, AC-GND-DC: GND DISP MODE: REAL	Check that the beam spot disappears when the INTEN control is turned to the counterclockwise extreme position.		
11	ASTIG	RV603	A6		INTEN: MAX Others: Same as Item 10.	Adjust so that the beam spot becomes a true circle when the FOCUS control is turned to the clockwise and counterclockwise extreme position.	OK: ⊘ NG: ⊘ ⊘	For adjustment, open the HV case.
12	ILLUM					Check that the graticule is illuminated red when the FOCUS control is turned clockwise.		
13	TRACE ROTATION				VERT MODE: CH1 CH1, AC-GND-DC: GND DISP MODE: REAL SWEEP MODE: AUTO CH1, VOLTS/DIV: 5 mV TRIGGERING: INT	(1) Move the trace to the center of screen with the CH1 POSITION control. (2) Adjust the trace in parallel to the horizontal scale lines of graticule, with the TRACE ROTATION control.		

No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	REAL VERTICAL PREAMPLIFIERS							
14	CH1 STEP BAL	RV101 (CH1)	A1		VERT MODE: CH1 DISP MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: GND CH1, VOLTS/DIV: 5 mV TRIGGERING: INT	(1) Set to the x5 MAG mode by pulling out the VARIABLE knob of VOLTS/DIV switch, and turn the VARIABLE knob to the CAL'D position. (2) Move the trace to the center line of the graticule with the CH1 POSITION control. (3) Adjust the CH1 STEP BAL control so that shift of the trace becomes not greater than 0.2 DIV when the VOLTS/DIV switch is changed as 5 mV 10 mV 20 mV.		
15	CH1 DC BAL	RV103 (CH1)	A1		Same as those for CH1 STEP BAL	(1) Set to the x5 MAG mode by pulling out the VARIABLE knob of VOLTS/DIV switch. (2) Turn the VARIABLE knob to the CAL'D position. (3) Align the trace with the center line of graticule by adjusting the POSITION control. (4) Turn the VARIABLE knob to the counterclockwise extreme position. Align the trace with the center line of graticule by adjusting the CH1 DC BAL control. (5) Repeat the procedure of (2) – (4) several times so that the shift of the trace becomes not grater than 0.2 DIV.		Do Item 14 before this.
16	CH1 MAG BAL	RV104 (CH1)	A1		Same as those for CH1 STEP BAL	(1) Turn the VARIABLE knob to the CAL'D position. (2) Pushing in and pulling out the VARIABLE knob, adjust shift of trace to less than 0.2 DIV.		
17	CH2 STEP BAL	RV101 (CH2)	A1		VERT MODE: CH2 CH2, AC-GND-DC: GND CH2, VOLTS/DIV: 5 mV Others: Same as Item 14.	Adjust in the same manner as for CH1 STEP BAL.		
18	CH2 DC BAL	RV103 (CH2)	A1		Same as those for CH2 STEP BAL.	Adjust in the same manner as for CH1 STEP BAL.		Do Item 17 before this.
19	CH2 MAG BAL	RV104 (CH2)	A1		Same as those for CH2 STEP BAL.	Adjust in the same manner as for CH1 MAG BAL.		Do Item 18 before this.



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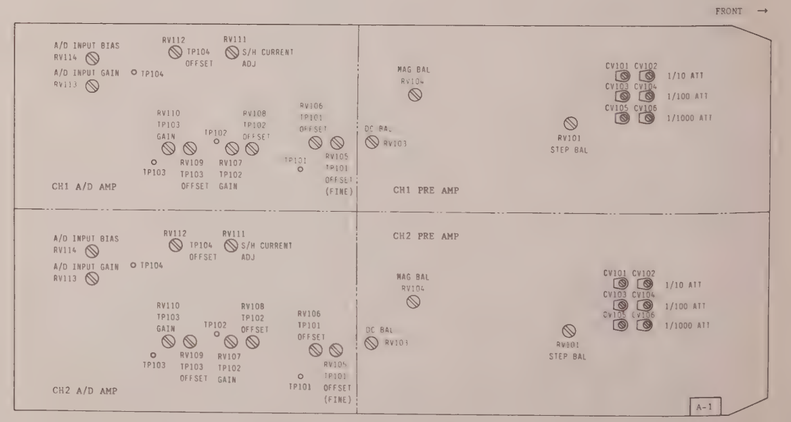

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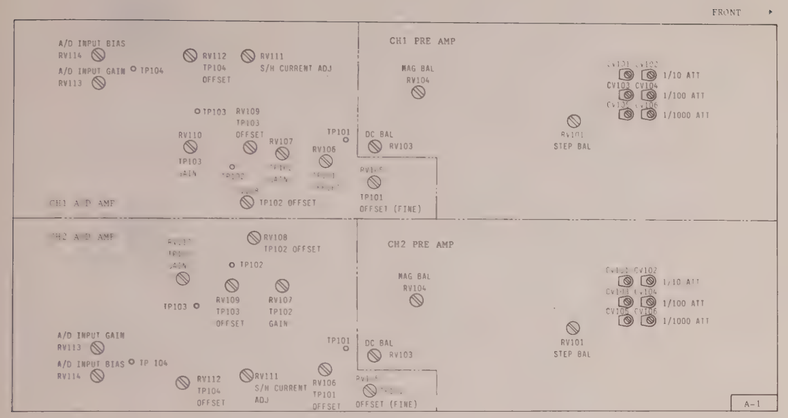

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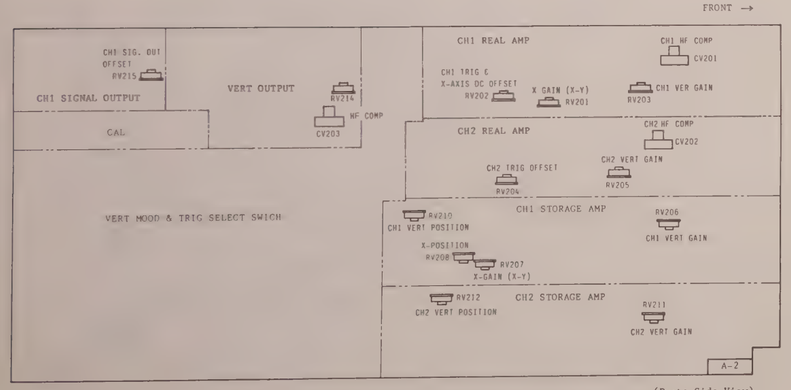
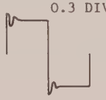
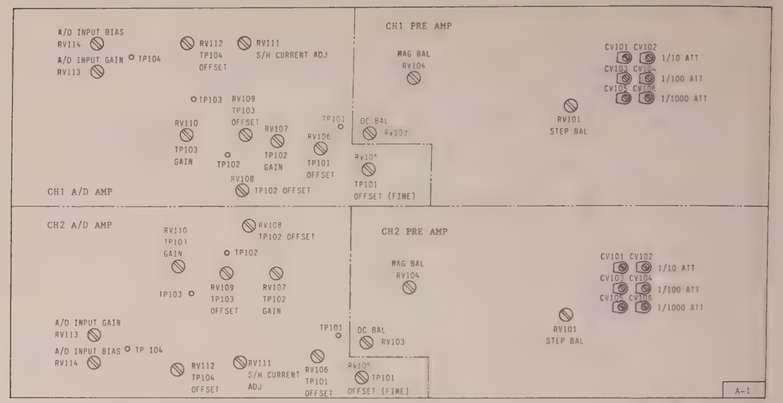


(Parts Side View)

No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
20	CH1 INPUT CAPACITANCE 50 mV RANGE	CV102 (CH1)	A1	Capacitance meter	CH1, COLTS/DIV: 50 mV CH1, AC-GND-DC: AC	(1) Set the input range at 5 mV and measure the input capacitance with the capacitance meter. Adjust the input capacitance to 33 pF ±2 pF with capacitor CV102. (2) Changing the input range setting to other ranges, adjust the input capacitances to the value same with that of the 5 mV range, with respective capacitors. Input capacitance: 33 pF ±2 pF		
21	CH1 INPUT CAPACITANCE 0.5 V RANGE	CV104 (CH1)	A1		CH1, VOLTS/DIV: 0.5 V CH1, AC-GND-DC: AC			
22	CH1 INPUT CAPACITANCE 5 V RANGE	CV106 (CH1)	A1		CH1, VOLTS/DIV: 5 V CH1, AC-GND-DC: AC			
23	CH2 INPUT CAPACITANCE 50 mV RANGE	CV102 (CH2)	A1		CH2, VOLTS/DIV: 50 mV CH2, AC-GND-DC: AC			
24	CH2 INPUT CAPACITANCE 0.5 V RANGE	CV104 (CH2)	A1		CH2, VOLTS/DIV: 0.5 V CH2, AC-GND-DC: AC			
25	CH2 INPUT CAPACITANCE 5 V RANGE	CV106 (CH2)	A1		CH2, VOLTS/DIV: 5 V CH2, AC-GND-DC: AC			
26	INPUT RESISTANCE CHECK			Ohmmeter	CH1, CH2, AC-GND-DC: DC CH1, CH2, VOLTS/DIV: 50 mV, 0.5 V, 5 V	(1) Connect the ohmmeter between the input terminals. (2) Check that the input resistances at all ranges are 1 MΩ ±2%.		
◎	SENSITIVITY ADJSUTMENT OF REAL VERTICAL AMPLIFIERS							
27	CH1 SENSITIVITY	RV203	A2	Voltage-axis calibrator	VERT MODE: CH1 DISP MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: DC CH1, VOLTS/DIV: 5 mV VARIABLE: CAL'D TRIGGERING: INT INT TRIG: CH1	(1) Set the calibrator output at 20 mV and apply it to the CH1 input terminal. (2) Move the displayed signal to the center of screen with the CH1 POSITION control. (3) Adjust the displayed signal amplitude to 4 DIV with RV203. Sensitivity accuracy: ±5%		Calibrate other ranges also.
28	CH2 SENSITIVITY	RV205	A2	Voltage-axis calibrator	VERT MODE: CH2 CH2, AC-GND-DC: DC CH2, VOLTS/DIV: 5 mV VARIABLE: CAL'D INT TRIG: CH2 Others: Same as Item 27.	Calibrate in the same manner as that of Item 27.		Calibrate other ranges also.

No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	ADJUSTMENT OF SQUARE-WAVE CHARACTERISTICS OF REAL VERTICAL							
29	CH1 50 mV RANGE MEDIUM FREQ. RANGE	CV101 (CH1)	A1	Pulse generator	VERT MODE: CH1 DISP MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: DC CH1, VOLTS/DIV: 50 mV INT TRIG: CH1 TRIGGERING: INT	(1) Apply a 1-kHz square-wave signal (without overshoots or sags and with a rise time faster than 1 usec) from the pulse generator to the oscilloscpe and display the signal with an amplitude of 4 DIV on the screen. (2) Adjust the TRIG LEVEL control so that the displayed waveform becomes stationary. (3) Adjust CV104 so that a flat response is obtained (an ideal square-waveform is displayed).	Adjustment needed Ideal waveform 	
30	CH1 0.5 V RANGE MEDIUM FREQ. RANGE	CV103 (CH1)			CH1, VOLTS/DIV: 0.5 V Others: Same as Item 29.	Adjust in the same manner as in Item 29.		
31	CH1 5 V RANGE MEDIUM FREQ. RANGE	CV105 (CH1)			CH1, VOLTS/DIV: 5 V Others: Same as Item 29.	Adjust in the same manner as in Item 29.		
32	CH2 50 mV RANGE MEDIUM FREQ. RANGE	CV101 (CH2)			VERT MODE: CH2 CH2, AC-GND-DC: DC CH2, VOLTS/DIV: 50 mV INT TRIG: CH2 Others: Same as Item 29.	Adjust in the same manner as in Item 29.		
33	CH2 0.5 V RANGE MEDIUM FREQ. RANGE	CV103 (CH2)			CH2, VOLTS/DIV: 0.5 V Others: Same as Item 32.	Adjsut in the same manner as in Item 29.		
34	CH2 5 V RANGE MEDIUM FREQ. RANGE	CV105 (CH2)			CH2, VOLTS/DIV: 5 V Others: Same as Item 32.	Adjust in the same manner as in Item 29.		
35	CH1 HIGH FREQ. RANGE	CV201 CV203 RV214	A2	Pulse generator	VERT MODE: CH1 DISP MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: DC CH1 VOLTS/DIV: 5 mV TIME/DIV: 1 µs INT TRIG: CH1 TRIGGERING: INT	(1) Apply a 500-kHz square-wave signal (quality waveform with rise time faster than 5 nsec) from the pulse generator to CH1 of the oscilloscope and display the signal with an amplitude of 4 DIV on the screen. (2) Adjust the waveform flat with CV203, RV214. and CV201. (3) Switch the input to CH2 and adjust the displayed waveform flat with CV202 and RV214 (4) Switch the input to CH1 and adjust the displayed waveform flat with CV201 (5) Check that the frequency response meets the following requirement: 5 mV range: 20MHz/-3dB 1 mV range: 10MHz/-3dB With reference to 8 DIV, -3 dB is 5.7 DIV.	Adjustment needed Acceptable Not grater than 0.3 DIV 	Adjust CH1 and CH2 at the same time
36	CH2 HIGH FREQ. RANGE	CV202 RV214			VERT MODE: CH2 CH2, AC-GND-DC: DC CH2, VOLTS/DIV: 5 mV INT TRIG: CH2 Others: Same as Item 35.			



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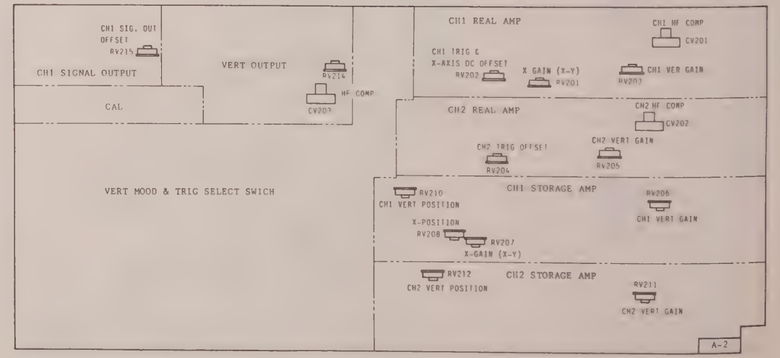

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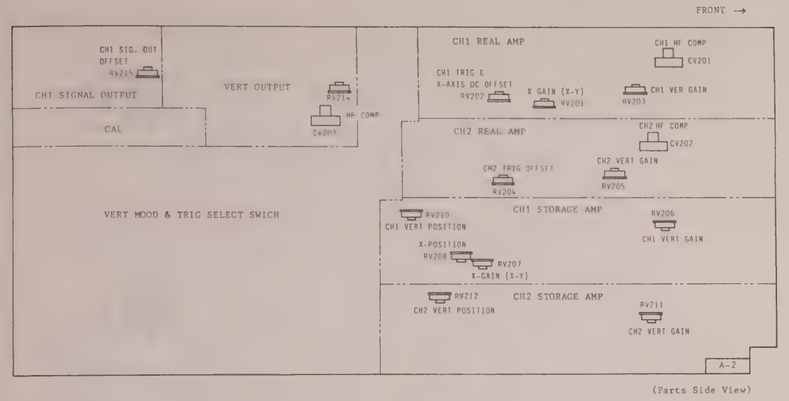

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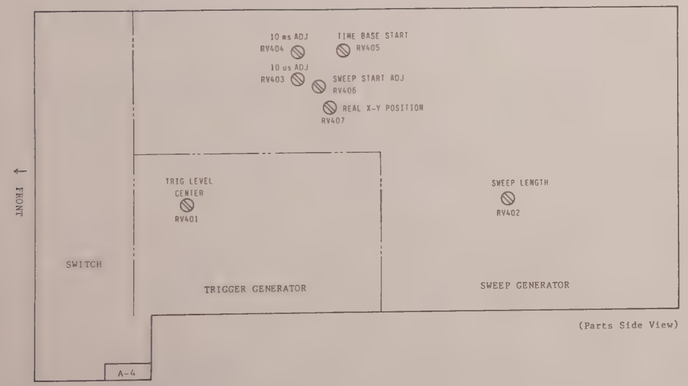

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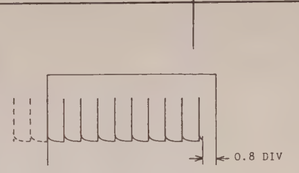
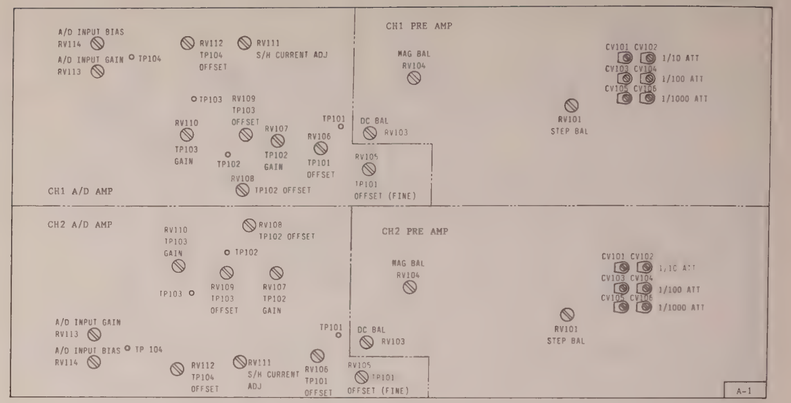
No.	ITEM	CONROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	ADJUSTMENT OF X-AXIS GAIN (REAL)							
37	X-AXIS GAIN	RV201	A2	Voltage-axis calibrator	VERT MODE: X-Y DISP MODE: REAL CH1, VOLTS/DIV: 5 mV CH2, AC-GND-DC: GND VARIABLE: CAL'D CH1, AC-GND-DC: AC	(1) Set the calibrator output at 20 mV. (2) Move the displayed waveform to the center of the screen with the Y POSITION (CH2) and X POSITION (HOR) controls. (3) Adjust the displayed waveform amplifude to 4 DIV with RV201.		Sensitivity of CH1 must be adjusted before this.
◎	ADJUSTMENT OF TRIGGER CIRCUIT							
38	TRIGGER LEVEL CENTER	RV401	A4	RC OSCILATOR oscillator	VERT MODE: CH1 DISP MODE: REAL SWEEP MODE: AUTO TIME/DIV: 0.2 ms TRIGGERING: AC,INT INT TRIG: CH1	(1) Display a 1-kHz sine-wave signal with an amplitude of 8 DIV by adjsuting oscillator output. (2) Set the white dot of the TRIGGERING LEVEL knob at the noon position. (3) Set the AC-GND-DC switch of CH1 to the GND position and move the trace to the center of the screen. (Setting of GND level) (4) Change the AC-GND-DC switch of CH1 to the AC position. (5) Adjsut the starting point of the displayed waveform to the GND level with RV401.	Adjusted waveform GND level	
39	CH1 TRIGGER DC OFFSET	RV202	A2		TRIGGERING: DC, INT Others: Same as Item 38.	Switching the TRIGGERING selector between AC and DC, adjust the starting point of DC to that of AC with RV202 or RV204.		As the X-axis gain will vary. check the gain as explained in Item 37.
40	CH2 TRIGGER DC OFFSET	RV204			VERT MODE: CH2 INT TRIG: CH2 TRIGGERING: DC, INT Others: Same as Item 38.			
◎	CALIBRATION OF TIME BASE (REAL)							
41	CALIBRATION OF 10 usec/DIV	RV403	A4	Time marker signal generator	VERT MODE: CH1 DISPALY MODE: REAL SWEEP MODE: AUTO CH1, VOLTS/DIV: 0.5 V CH1, AC-GND-DC: DC TIME/DIV: 10 μs INT TRIG: CH1 TRIGGERING: INT	(1) Apply a 10-usec marker signal of the signal generator to the oscilloscope. (2) Adjust the marker signal pulses to the vertical scale lines of the graticule with RV403.		Calibrate other range also.
42	CALIBRATION OF 10 msec/DIV	RV404	A4		TIME/DIV: 10 ms Others: Same as Item 41.	(1) Set the marker signal to 10 msec and perform an identical calibration as in Item 41.		

No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
43	CALIBRATION OF SWEEP LENGTH	RV402	A4	Time marker signal generator	TIME/DIV: 1 ms Others: Same as Item 41.	(1) Set the marker signal to 1 msec. (2) Move the displayed waveform leftward until its initial two divisions are moved beyond the left-hand end of the graticule scale, with the horizontal POSITION control. (3) Adjust the sweep length to the point of 0.8 DIV from the right-hand end of the graticule scale, with RV402. Sweep length = 11.2 DIV		
◎	CALIBRATION OF STORAGE VERTICAL AMPLIFIERS							
44	CH1 OFFSET (TP101)	RV105 RV106 (CH1)	A1	Oscilloscope	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, VOLTS/DIV: 5 mV CH1, AC-GND-DC: GND TIME/DIV: 0.2 ms TRIGGERING: INT PEN, SCOPE: SCOPE	(1) Connect the oscilloscope to TP101 and measure the DC voltage. (2) Adjust offset to within ±10 mV with RV105 and RV106.		
45	CH1 OFFSET (TP102)	RV108 (CH1)	A1	Oscilloscope	Same as Item 44.	Connect the oscilloscope to TP102 and adjust offset to within ±10 mV with RV108.		
46	CH1 OFFSET (TP103)	RV109 (CH1)	A1	Oscilloscope	Same as Item 44.	Connect the oscilloscope to TP103 and adjust offset to within ±10 mV with RV109.		
46-1	S/H CURRENT ADJ	RV111 (CH1)	A1			Set to the center position of RV111.		
46-2	CH1 OFFSET (TP104)	RV112 (CH1)	A1	Oscilloscope	Same as Item 44.	Connect the oscilloscope to TP104 and adjust offset to within ±10 mV with RV112.		
47	CH2 OFFSET (TP101)	RV105 RV106 (CH2)	A1	Oscilloscope	VERT MODE: CH2 CH2, VOLTS/DIV: 5 mV CH2, AC-GND-DC: GND Others: Same as Item 44.	Connect the oscilloscope to TP101 and adjust offset to within ±10 mV with RV 105 (FINE) and RV106.		
48	CH2 OFFSET (TP102)	RV108 (CH2)	A1	Oscilloscope	Same as Item 47.	Connect the oscilloscope to TP102 and adjust offset to within ±10 mV with RV108.		
49	CH2 OFFSET (TP103)	RV109 (CH2)	A1	Oscilloscope	Same as Item 47	Connect the oscilloscope to TP103 and adjust offset to within ±10 mV with RV109.		
49-1	S/H CURRENT ADJ	RV111 (CH2)	A1			Set to the center position of RV111.		
49-2	CH2 OFFSET (TP104)	RV112 (CH2)	A1	Oscilloscope	Same as Item 47.	Connect the oscilloscope to TP104 and adjust offset to within ±10 mV RV112.		



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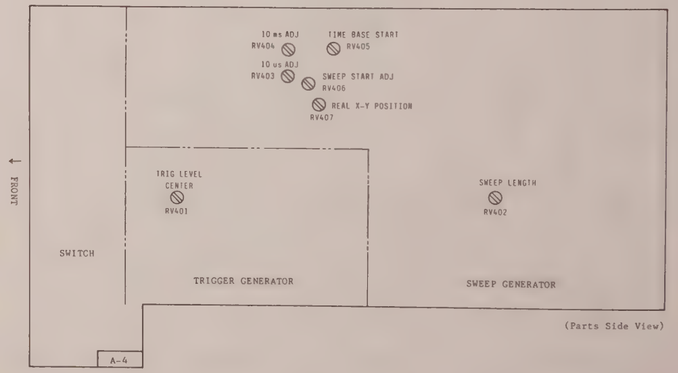

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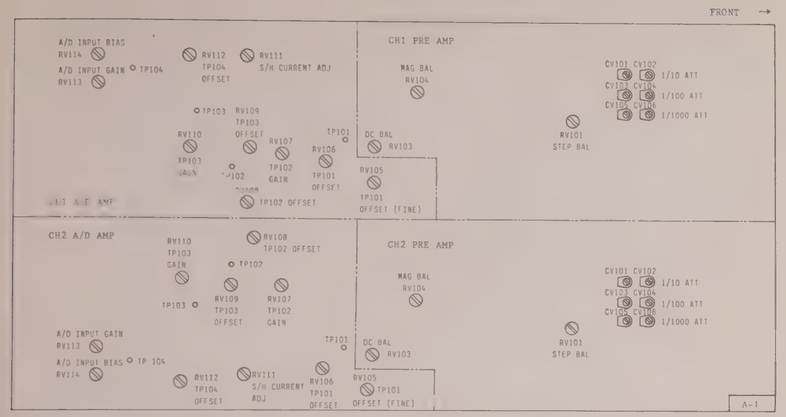

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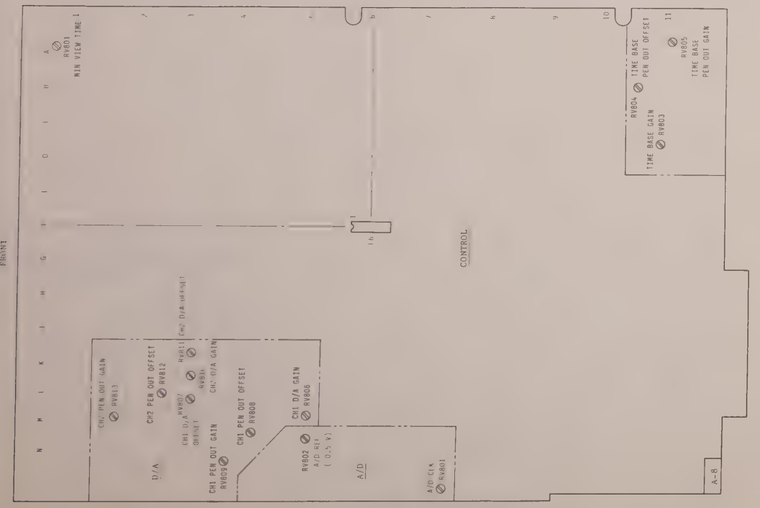
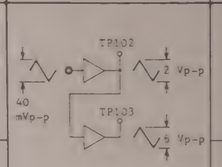
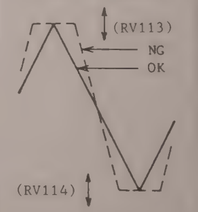
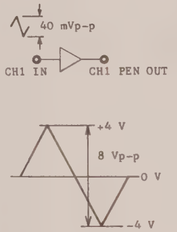
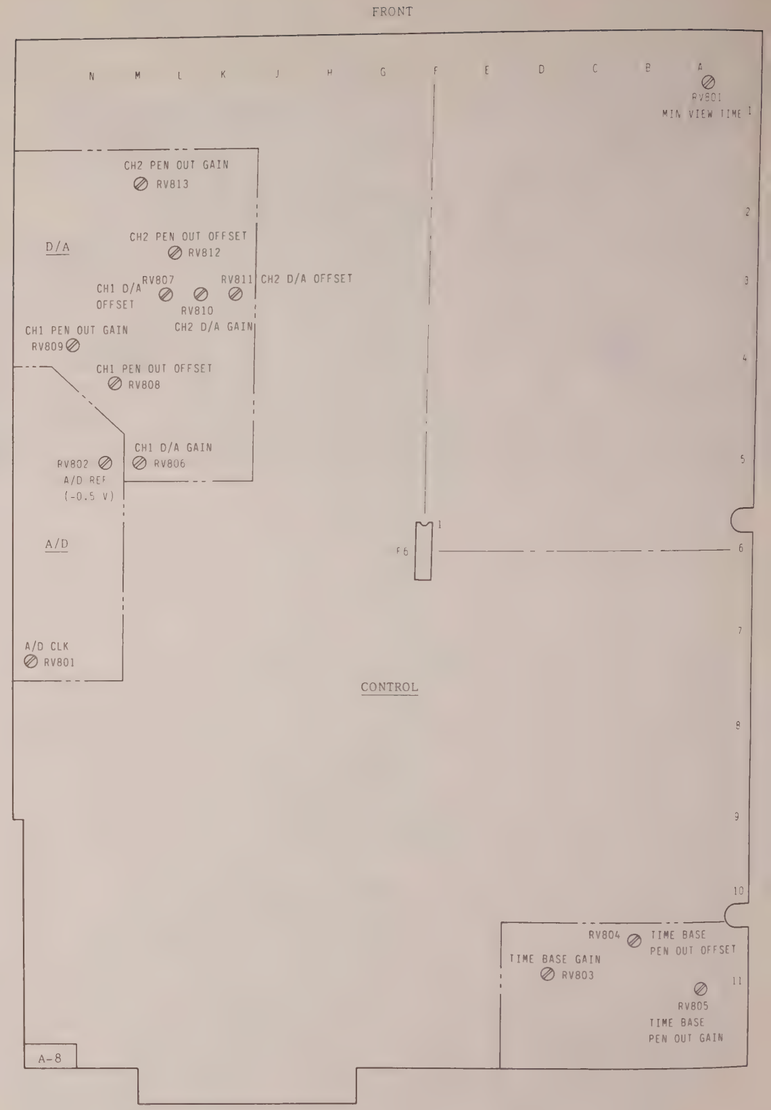
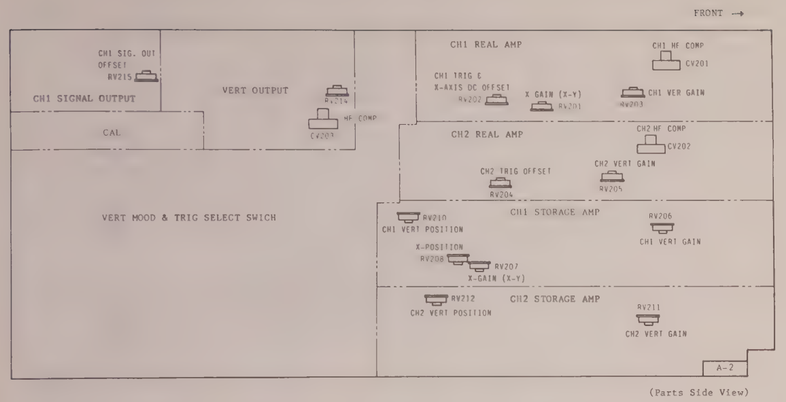


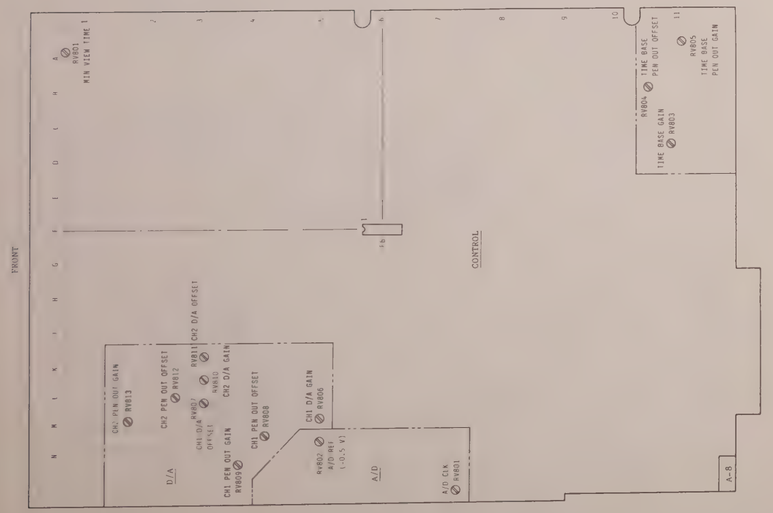
No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
50	CH1 TP102 GAIN	RV107 (CH1)	A1	Oscilloscope FG (Function Generator)	CH1, AC-GND-DC: AC VERT MODE: CH1	(1) Change the display mode to REAL. Apply an FG output of 1 KHz, 40 mVp-p (8 DIV). (2) Change the dispaly mode to ROLL. (3) Connect the oscilloscope to TP102 and adjust its voltage to 2 Vp-p with RV107.		
51	CH1 TP103 GAIN	RV110 (CH1)	A1	Oscilloscope FG	Same as Item 50.	Connect the oscilloscope to TP103. Adjust the voltage to 6 Vp-p with RV101.		
52	CH2 TP102 GAIN	RV107 (CH2)	A1	Oscilloscope FG	CH2, AC-GND-DC: AC VERT MODE: CH2 INT TRIG: CH2 Others: Same as Item 44.	Adjust in the same manner as in Item 50.	Refer to Item 50.	
53	CH2 TP103 GAIN	RV110 (CH2)	A1	Oscilloscope FG	Same as Item 52.			
◎	CALIBRATION OF A/D CONVERTERS							
54	A/D V_{REF}	RV802	A8	Digital voltmeter		(1) Connect the digital voltmeter to pin 13 (REF) and pin 15 (GND) of A/D converter. (2) Adjust the REF voltage to the following value with RV802. REF voltage = -0.499 V to -0.501 V		
55	CH1 A/D CONVERTER AMPLIFIER GAIN	RV113 RV114 (CH1)	A1	Oscilloscope FG	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MOED: AUTO TRIGGERING: INT CH1, VOLTS/DIV: 5 mV CH1, AC-GND-DC: AC TIME/DIV: 0.2 ms PEN, SCOPE: SCOPE PULL DC offset: push	(1) Set the triangular wave output of the function generator to 1 kHz, 44 mVp-p. (2) Apply the output of the function generator to the CH1 input terminal of the DSS6520. (3) Set the test oscilloscope to 0.1 mS/DIV and 0.1 V/DIV. Apply the signal of pin 8 and pin 1 (GND) of connector 8-3 of PC board A8 or that of the D/A OUT (PEN OUT) terminal of the DSS6520 to the test oscilloscope. (4) Adjust the dales of the triangular waveform to a point immediately before the point where the dales start to be crashed flat, with the A/D INPUT BIAS control (RV114). (5) Adjust the peak of the triangular waveform to a point immediately before the point where the peaks start to be crashed flat, with the A/D INPUT GAIN control (RV113). (6) Repeat alternately the procedures of (4) and (5) several times so that both condition become to be met simultanceously.	CH1 D/A output signal (or PEN OUT signal) 	
56	CH2 A/D CONVERTER AMPLIFIER GAIN	RV113 RV114 (CH2)	A1	Oscilloscope FG	VERT MODE: CH2 CH2, AC-GND-DC: AC CH2, VOLTS/DIV: 5 mV Others: Same as Item 55.	Adjust in the same manner as in Item 55.		

No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	CALIBRATION OF D/A CONVERTER AMPLIFIERS AND PEN OUTPUT AMPLIFIERS							
57	CH1 D/A CONVERTER AMPLIFIER OFFSET	RV807	A8	Oscilloscope	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, VOLTS/DIV: 5 mV CH1, AC-GND-DC: GND TIME/DIV: 0.2 µs TRIGGERING: INT PEN, SCOPE: SCOPE PULL DC OFFSET: Push	Connect the oscilloscope to TP 826 (for DC measurement). Adjust offset to within ±10 mV with RV807. Offset voltage: Within ±10 mV		
58	CH2 D/A CONVERTER AMPLIFIER OFFSET	Rv811	A8	Oscilloscope	VERT MODE: CH2 CH2, VOLTS/DIV: 5 mV CH2, AC-GND-DC: GND Others: Same as Item 57.	Connect the oscilloscope to TP828 and adjust offset in the same manner as in Item 57. Offset voltage: Within ±10 mV		
59	CH1 PEN OUT OFFSET	RV808	A8	Oscilloscope	Same as Item 57.	Connect the oscilloscope to CH1 PEN OUT terminal and adjust the offset voltage.		
60	CH2 PEN OUT OFFSET	RV812	A8	Oscilloscope	Same as Item 58.	Connect the oscilloscope to CH2 PEN OUT terminal and adjust the offset voltage in the same manner as in Item 58.		
61	CH1 D/A GAIN	RV806	A8	Oscilloscope FG	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, AC-GND-DC: AC CH1, VOLTS/DIV: 5 mV TIME/DIV: 0.2 ms TRIGGERING: INT INT TRIG: CH1	(1) Connect the oscilloscope to CH1 PEN OUT terminal. (2) Set the function generator output to a 40 mVp-p triangular signal and apply it to the CH1 input. (3) Set the CH1 PEN OUT GAIN control (RV809) at the center of its turning angle. (4) Adjust the PEN OUT voltage to 8 Vp-p with the CH1 D/A GAIN control.		Set the PEN OUT GAIN control as illustrated below. RV809 RV813
62	CH2 D/A GAIN	RV810	A8	Oscilloscope FG	VERT MODE: CH2 CH2, AC-GND-DC: AC CH2, VOLTS/DIV: 5 mV INT TRIG: CH2 Others: Same as Item 61.	Adjust in the same manner as in Item 61. CH2 PEN OUT GAIN (RV813)		

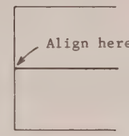
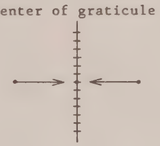
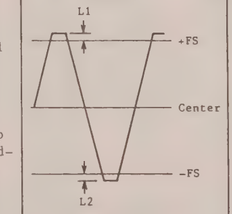


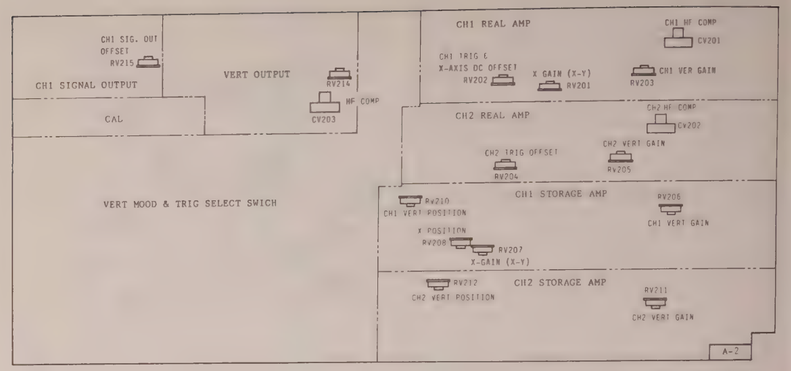


(Parts Side View)

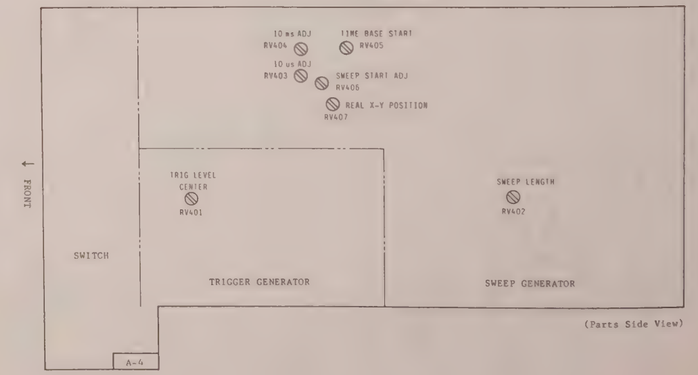


No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	CALIBRATION OF STORAGE TIME BASE & TIME BASE PEN OUT							
63	TIME BASE GAIN	RV803	A8	Time marker signal generator	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, VOLTS/DIV: 0.5 V CH1, AC-GND-DC: DC TIME/DIV: 1 ms INT TRIG: CH1 TRIGGERING: INT PEN, SCOPE: SCOP	(1) Apply a 1-msec marker signal from the MARKER OUT terminal of the signal generator to the input terminal of the DSS6520. (2) Align the pips of the marker signal with vertical scale line of the graticule.		
64	TIME BASE PEN OUT OFFSET	RV804	A8	Oscilloscope	PEN, SCOPE: PEN	(1) Connect the oscilloscope to the TIME BASE PEN CUT termisnl. (2) Check that the beam spot is stationaly at the left-hand end. If it is not at the left-hand end, press the RESET button. (3) Adjust the offset voltage to zero with RV804. Offset voltage: Within ±10 mV	PEN OUT signal 10.2 V PEN START	
65	TIME BASE PEN OUT GAIN	RV805	A8	Digital voltmeter or oscilloscope	PEN, SCOPE: PEN	(1) Connect the digital voltmeter to the TIME BASE PEN OUT terminal. (2) Press the PEN START button and check that the beam spot has moved to the right-hand end. (3) Adjsut the output voltage to 10.2 V with RV805.		
◎	CALIBRATION OF D/A CONVERTER VERTICAL-AXIS AMPLIFIER							
66	CH1 VERT GAIN	RV206	A2	Voltage-axis calibrator	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, AC-GND-DC: AC CH1, VOLTS/DIV: 5 mV TIME/DIV: 0.2 ms TRIGGERING: INT PEN, SCOPE: SCOPE INT TRIG: CH1	(1) Set the calibrator output at 20 mVp-p and apply it to the CH1 INPUT terminal. (2) Adjust the displayed CH1 signal amplitude to 4 DIV with RV206.		
67	CH1 X-GAIN	RV207	A2	Voltage-axis calibrator	VERT MODE: X-Y Others: Same as Item 66.	(1) Set the calibrator as in the case of Item 66. (2) Set the X-POSITION control (RV208) in the senter of its turning angle. (3) Adjust the sweep length to 4 DIV with RV207.		Refer to Item 71 (RV208).

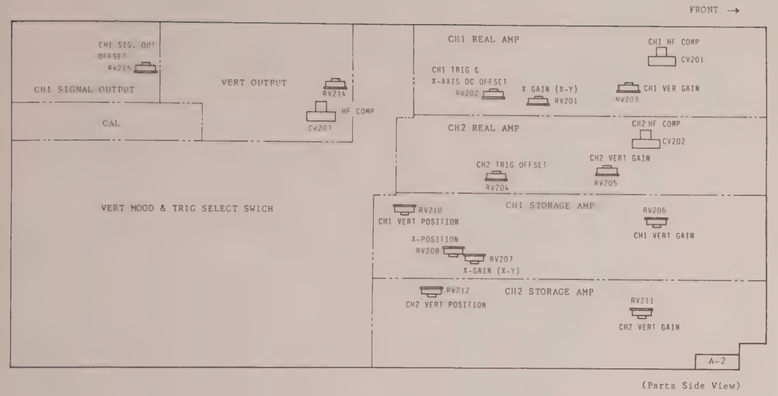
No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
68	CH2 VERT GAIN	RV211	A2	Voltage-axis calibrator	VERT MODE: CH2 CH2, AC-GND-DC: AC CH2, VOLTS/DIV: 5 mV INT TRIG: CH2 Others: Same as Item 66.	Adjust in the same manner as in Item 66.		
◎	POSITION ADJUSTMENT IN REAL OR STORAGE MODE							
69	REAL SWEEP START	RV406	A4		VERT MODE: CH1 DISPALY MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: GND TIME/DIV: 1 mV TRIGGERING: INT PEN, SCOPE: SCOPE	(1) Set the white dot of the horizontal POSITION knob in the noon position. (2) Align the start point of the trace with the left-hand end of the graticule by adjsuting RV406.		Perform simultaneously the proceuures of Items 69 through 72.
70	REAL X-Y POSITION	RV407	A4		VERT MODE: X-Y Others: Same as Item 69.	(1) Set the horizontal POSITION knob as in the case of Item 69. (2) Adjust the beam spot to the horizontal center of the graticule.		
71	STORAGE X-Y POSITION	RV208	A2		VERT MODE: X-Y DISPLAY MODE: ROLL Others: Same as Item 69.	Adjust in the same manner as in the case of Item 70.		
72	STORAGE TIME BASE START	RV405	A4		VERT MODE: CH1 DISPLAY MODE: ROLL Others: Same as Item 69.	Adjust in the same manner as in the case of Item 69.		
73	STORAGE CH1 VERT POSITION	RV210	A2	FG	VERT MODE: CH1 DISPLAY MODE: ROLL SWEEP MODE: AUTO CH1, AC-GND-DC: AC CH1, VOLTS/DIV: 5 mV TIME/DIV: 0.2 ms TRIGGERING: INT PEN, SCOPE: SCOPE INT TRIG: CH1	(1) Set the function generator output to 1 kHz triangular-wave signal of 60 mVp-p. (2) Apply the function generator output to the CH1 INPUT terminal. (3) Pull out the CH1 DC OFFSET knob. (4) Adjust the waveform with RV210 so that the top and bottom saturating points which have exseeded the top and bottom of the graticule become identical as illustrated.	 L1 = L2 ≒ 0.4 DIV	
74	STORAGE CH2 VERT POSITION	RV212	A2	FG	VERT MODE: CH2 CH2, AC-GND-DC: AC CH2, VOLTS/DIV: 5 mV INT TRIG: CH2 Others: Same as Item 73.	Adjust in the same manner as in the case of Item 73.		This adjustment can be conveniently accomplished by operating the DSS6521 in the DUAL mode and adjusting the CH2 waveform so that it is overlapped on the CH1 waveforms.



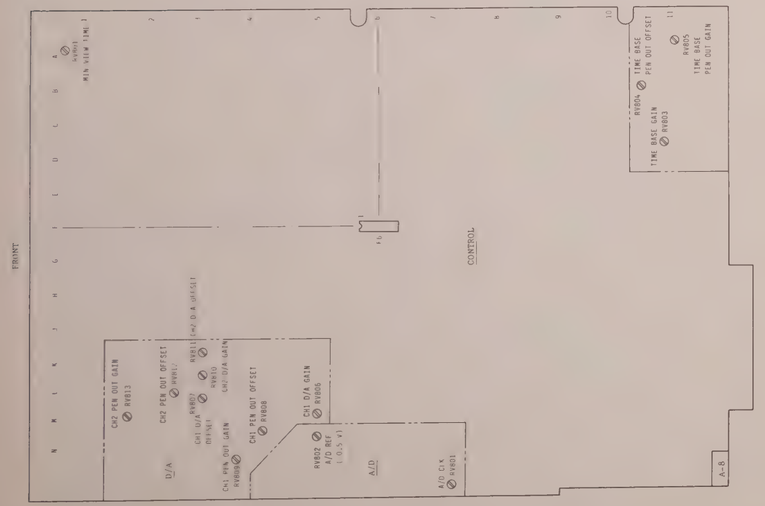
(Parts Side View)



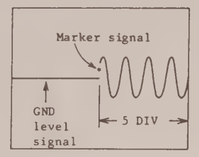
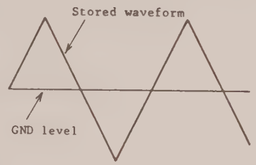
(Parts Side View)

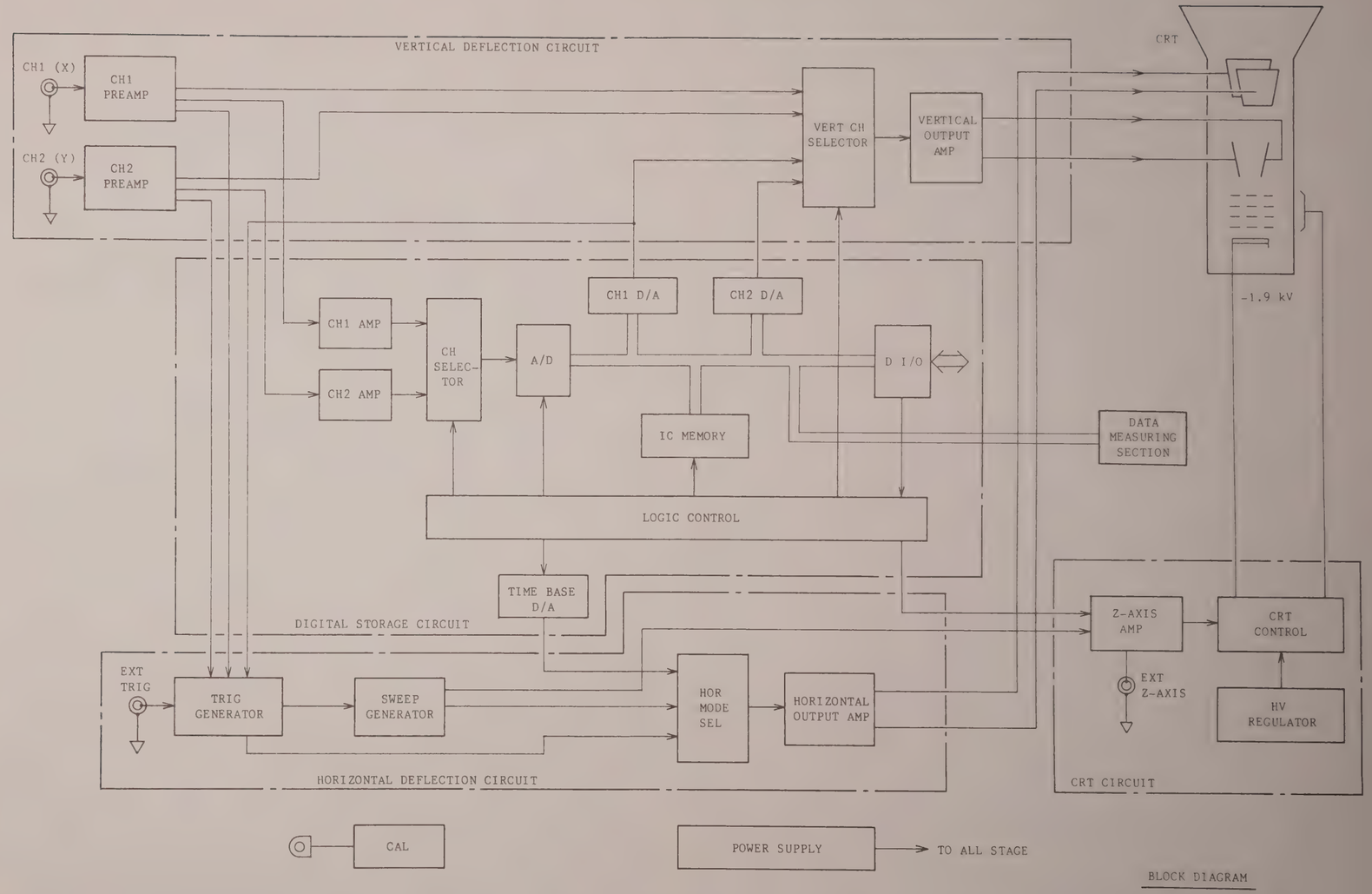


(Parts Side View)

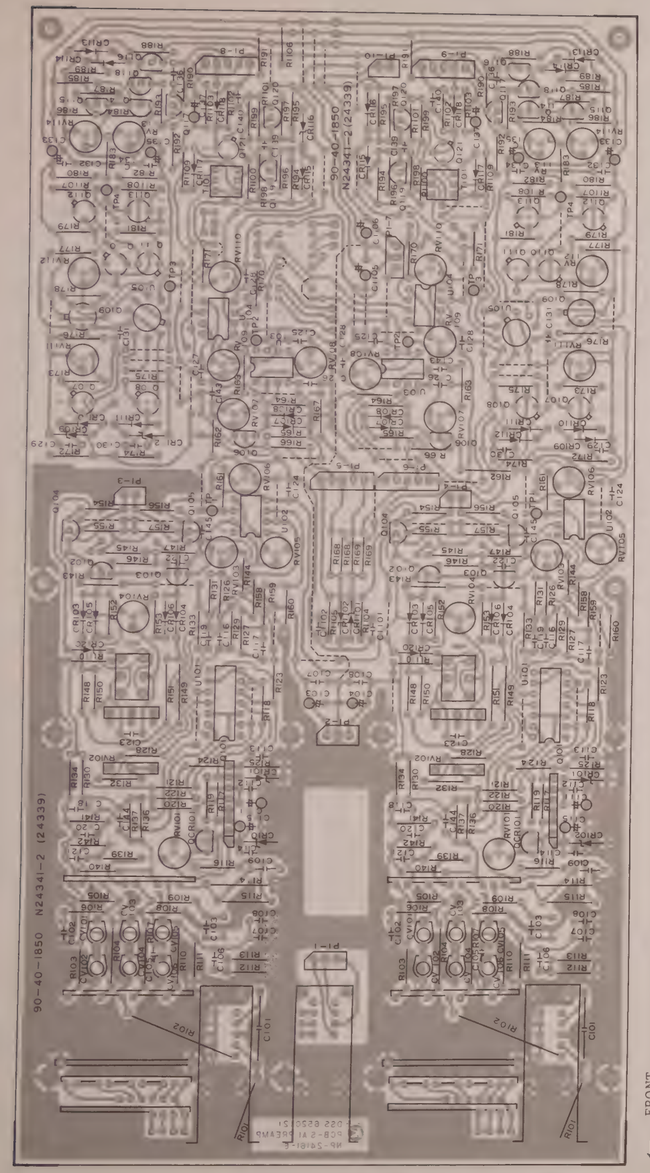


No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
◎	ADJUSTMENT OF VIEW TIME & CH1 SIGNAL OUT							
75	ADJUSTMENT OF VIEW TIME MIN	RV801	A8	Universal counter	VIEW TIME: MIN	(1) Connect the universal counter to pin 15 of connector 8-5 of PC board A8. (2) In the time measuring mode, adjust with RV801 so that the period becomes 490 msec.		
76	CH1 SIGNAL OUT OFFSET	RV215	A2	Oscilloscope or digital voltmeter	VERT MODE: CH1 DISPLAY MODE: REAL SWEEP MODE: AUTO CH1, AC-GND-DC: GND TIME/DIV: 1 ms TRIGGERING: INT PEN, SCOPE: SCOPE	(1) Adjust the trace to the vertical center of the graticule with the CH1 POSITION control. (2) Connect the oscilloscope to the CH1 SIGNAL OUT terminal. (3) Adjust the offset voltage with RV215. Offset voltage: ±3 mV or less		
◎	CHECK ITEMS							
77	CH1 PULL DC OFFSET & CH2 PULL DC OFFSET		Front	FG	VERT MODE: DUAL DISPLAY MOCE: ROLL SWEEP MODE: AUTO CH1, CH2, AC-GND-DC: DC TIME/DIV: 0.2 ms TRIGGERING: INT PEN, SCOPE: SCOPE INT TRIG: CH1 PULL DC offset: pull	(1) Set the function generator output to a 1 kHz triangular signal with such amplitude that the displayed waveform is within the screen. (2) By turning the DC OFFSET POSITION control, check that the displayed waveform moves vertically within the screen.		
78	CALIB		Front	Oscilloscope		Connect the oscilloscope to the CALIB output terminal and check that a 1 Vp-p squar-wave signal is being delivered.		
79	REAL & STORAGE		Front	FG	DISPLAY MODE: REAL & STORAGE Others: Same as Item 77.	Check that the REAL waveform and STORAGE waveform are displayed on the screen.		
80	AUTO ERASE		Front	FG	DISPLAY MODE: REAL & ERASE TIME/DIV: 50 ms Others: Same as Item 77.	Lower the frequency of the function generator output and check that the displayed waveform extends rightward from the left-hand end.		

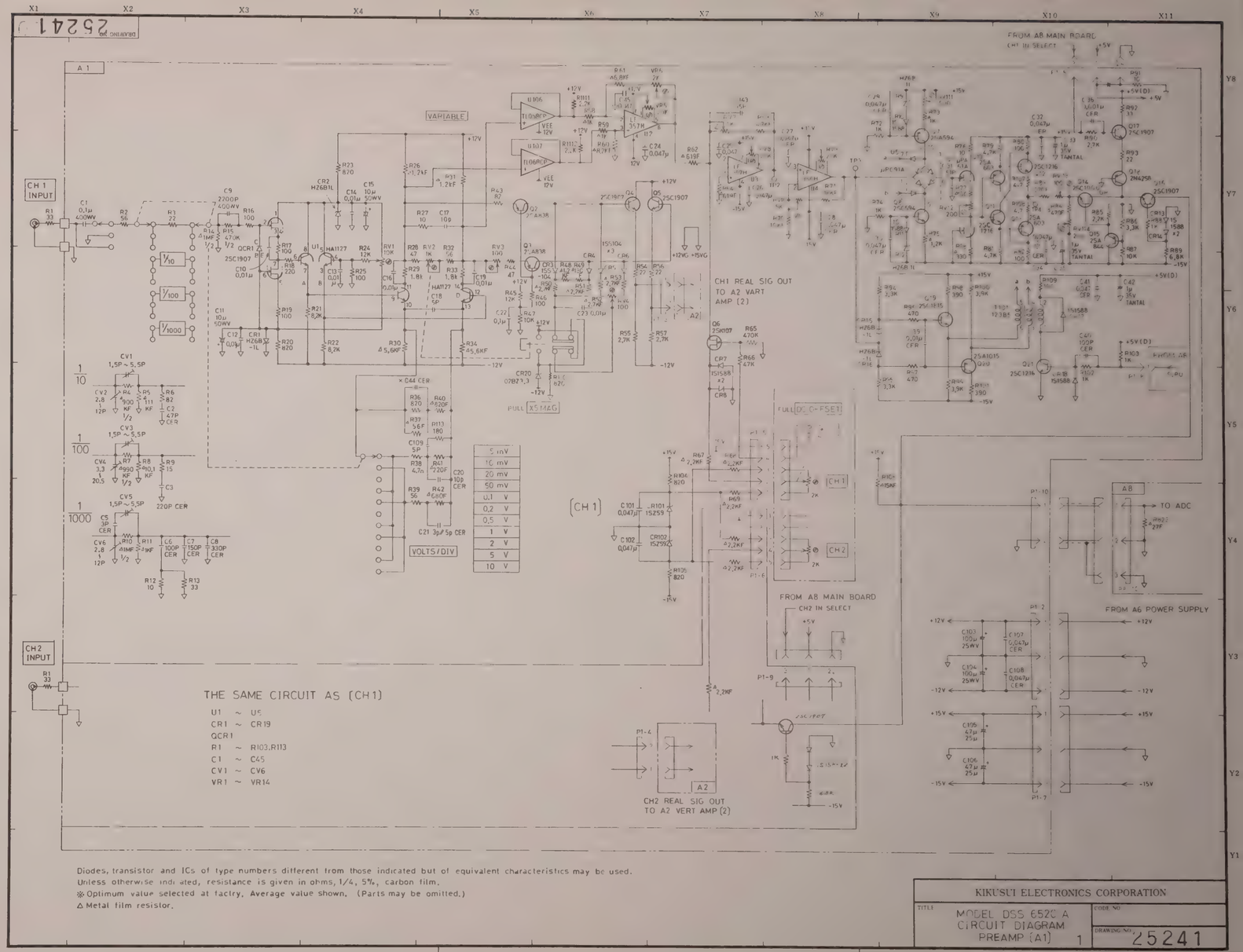
No.	ITEM	CONTROLS	PC BOARD	CALIBRATION INSTRUMENTS	SETTING OF CONTROLS	CHECK & CALIBRATION PROCEDURE	ILLUSTRATION	REMARKS
81	PRE DELAY		Front	FG	DISPLAY MODE: ROLL PREDELAY VERT MODE: CH1 CH1, VOLTS/DIV: 5 mV TIME/DIV: 10 ms PULL DC OFFSET: Push Others: Same as Item 77.	(1) Set the function generator output at 100 Hz, 40 mV. Apply it to the CH1 INPUT terminal. (2) Set the AC-GND-DC switch to the GND position. (3) Press the SIGNAL button of SWEEP MODE selector and check that the READY lamp lights. (4) Set the digital switches of the TRIG POINT selector at 5.0 . (5) Set the CH1 AC-GND-DC switch to the DC position. (6) Check that the marker signal which indicates the triggering point and the signal waveform are displayed in the center of the screen. Check that the READY lamp goes off and the STORED lamp lights.		
82	MEMORY PROTECT		Front	FG	VERT MODE: CH1	(1) Set the function generator output at 1 kHz triangular wave of 40 mV and apply it to the CH1 INPUT terminal. (2) When a period of one second or more has elapsed, press both MEMORY PROTECT buttons at the same time. Check that the PROTECT lamp lights. (3) Change the CH1 AC-GND-DC switch to the GND position and check that the displayed waveform remains unaltered. (4) Pull out the CH1 MEMORY PROTECT knob. (5) Check that the GND level is stored in CH1 and original waveform also is stored. See Fig. 1. (6) Next, pull out the CH2 MEMORY PROTEC knob. (7) Check that the stored pattern becomes a horizontal straight line.	Fig. 1 	



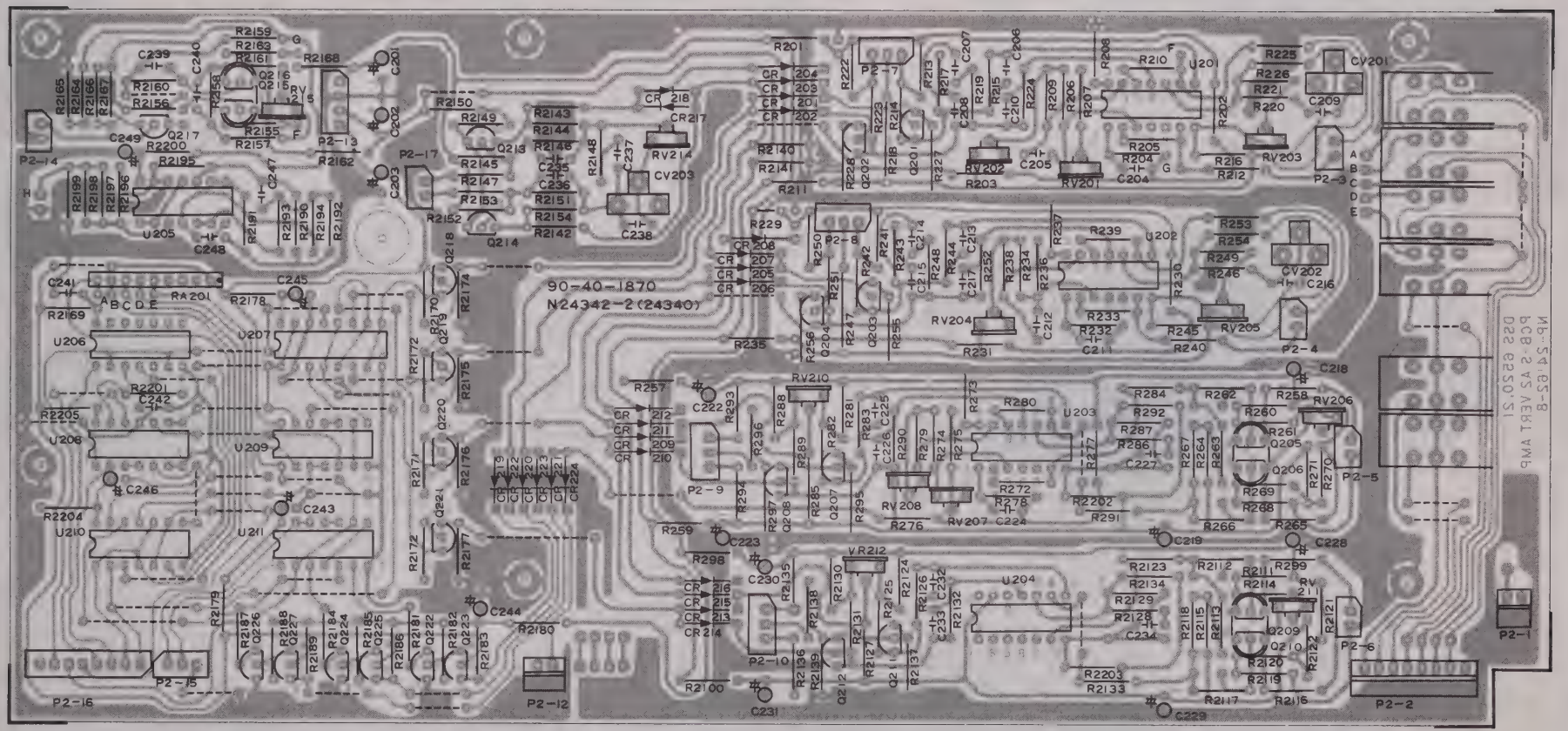
BLOCK DIAGRAM



VERT PREAMP A1 PARTS LOCATION DIAGRAM

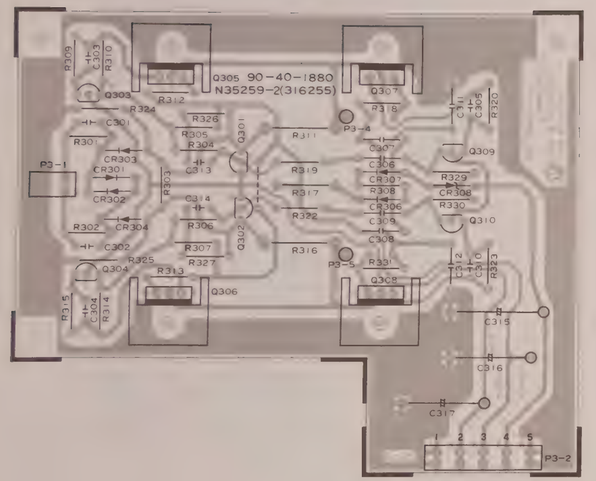


FRONT →



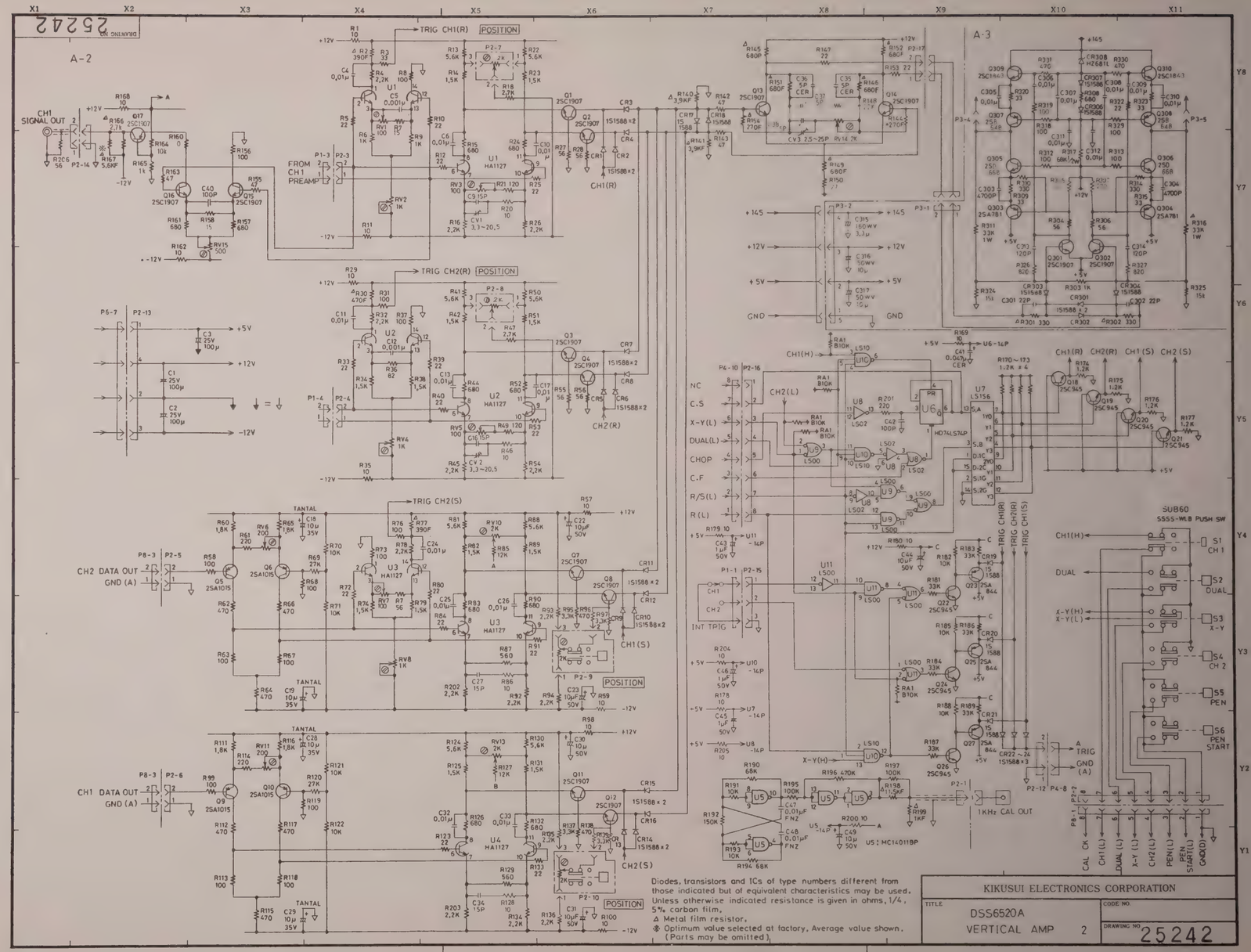
(Parts Side View)

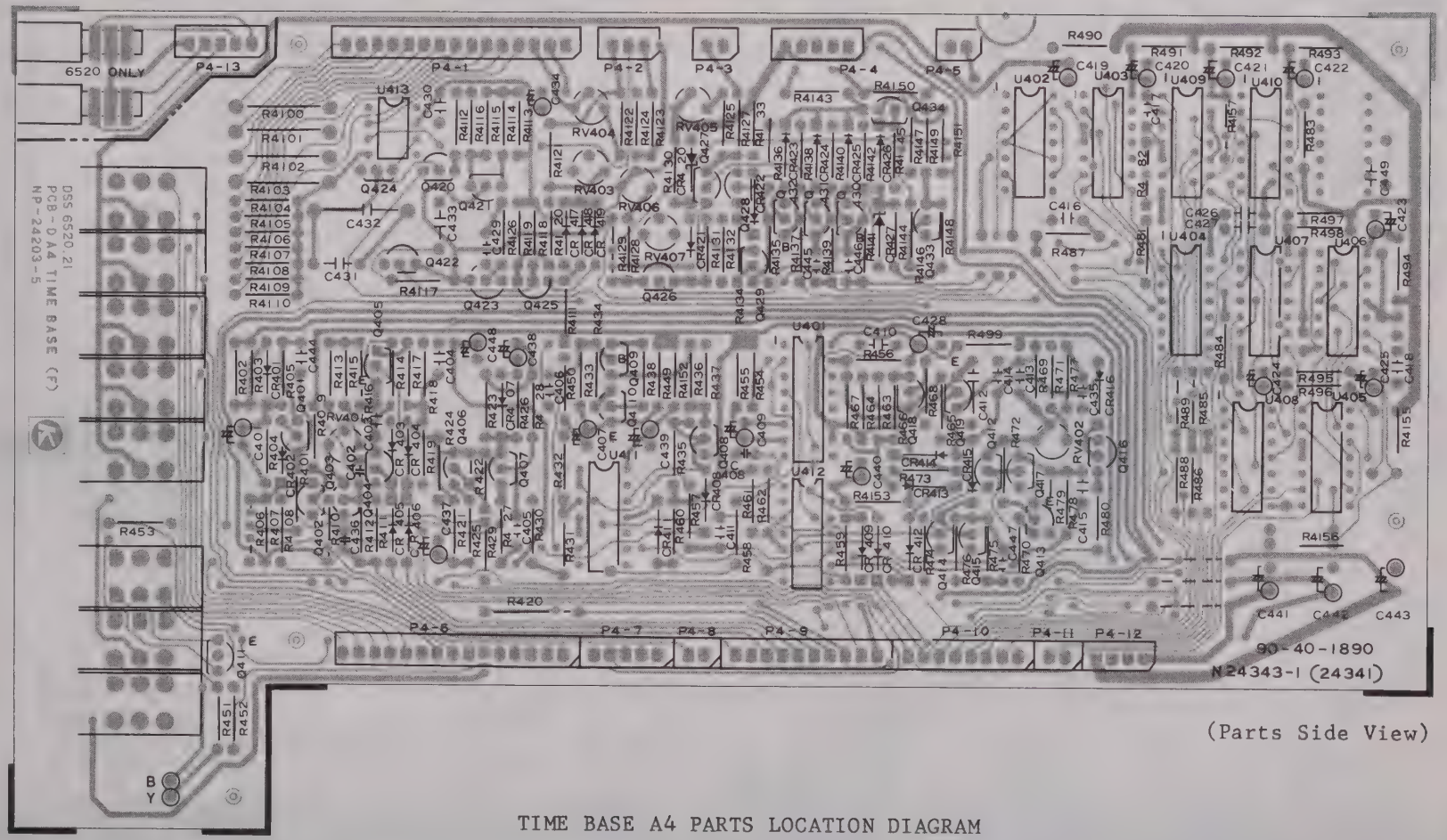
VERT AMP A2 PARTS LOCATION DIAGRAM



(Parts Side View)

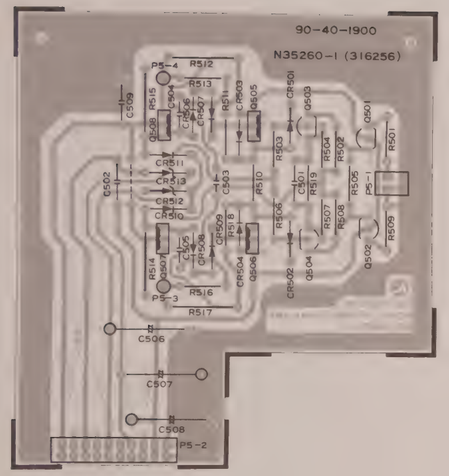
VERT FINAL AMP A3 PARTS LOCATION DIAGRAM





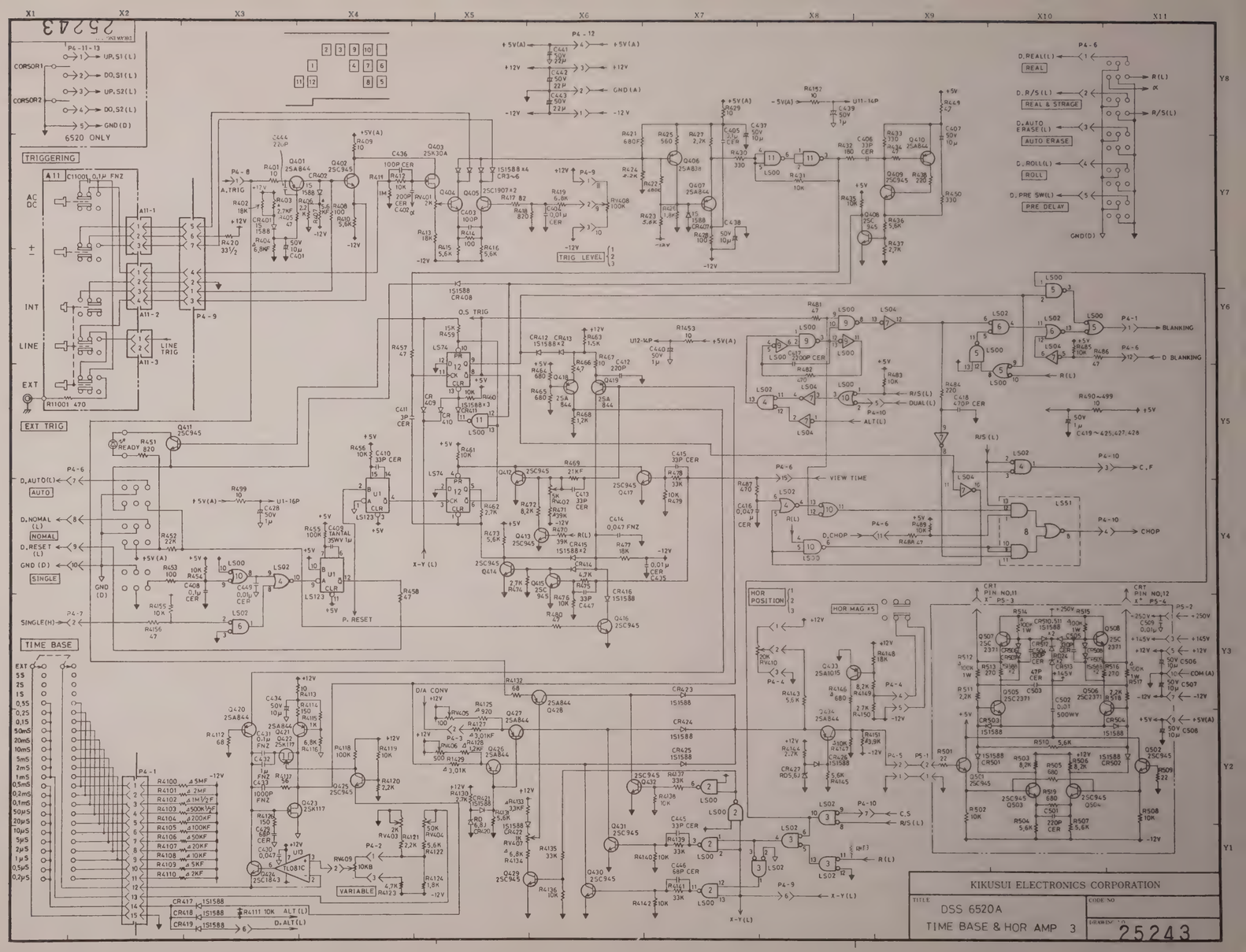
(Parts Side View)

TIME BASE A4 PARTS LOCATION DIAGRAM



(Parts Side View)

HORI FINAL AMP A5 PARTS LOCATION DIAGRAM



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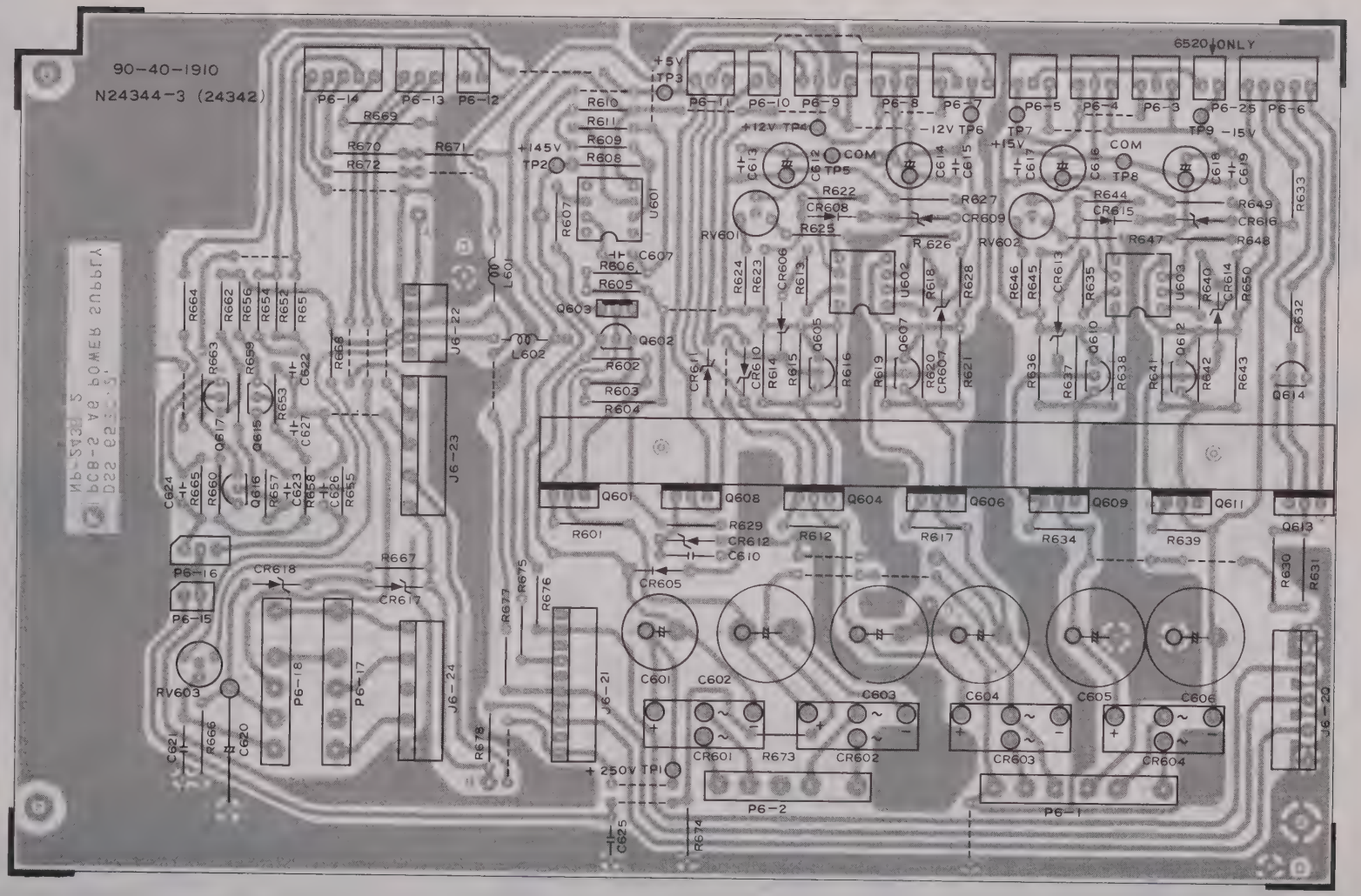
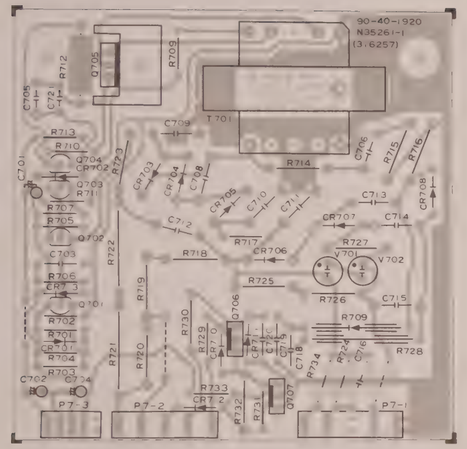


(Parts Side View)

POWER SUPPLY A6 PARTS LOCATION DIAGRAM



(Parts Side View)

H.V UNIT A7 PARTS LOCATION DIAGRAM

DRAWING NO. 25244

TRACE ROTATION

ASTIG

FOCUS

ILLUM

INTEN

A-7

A6

A9

POWER SW

NOISE FILTER

AC LINE 50/60Hz

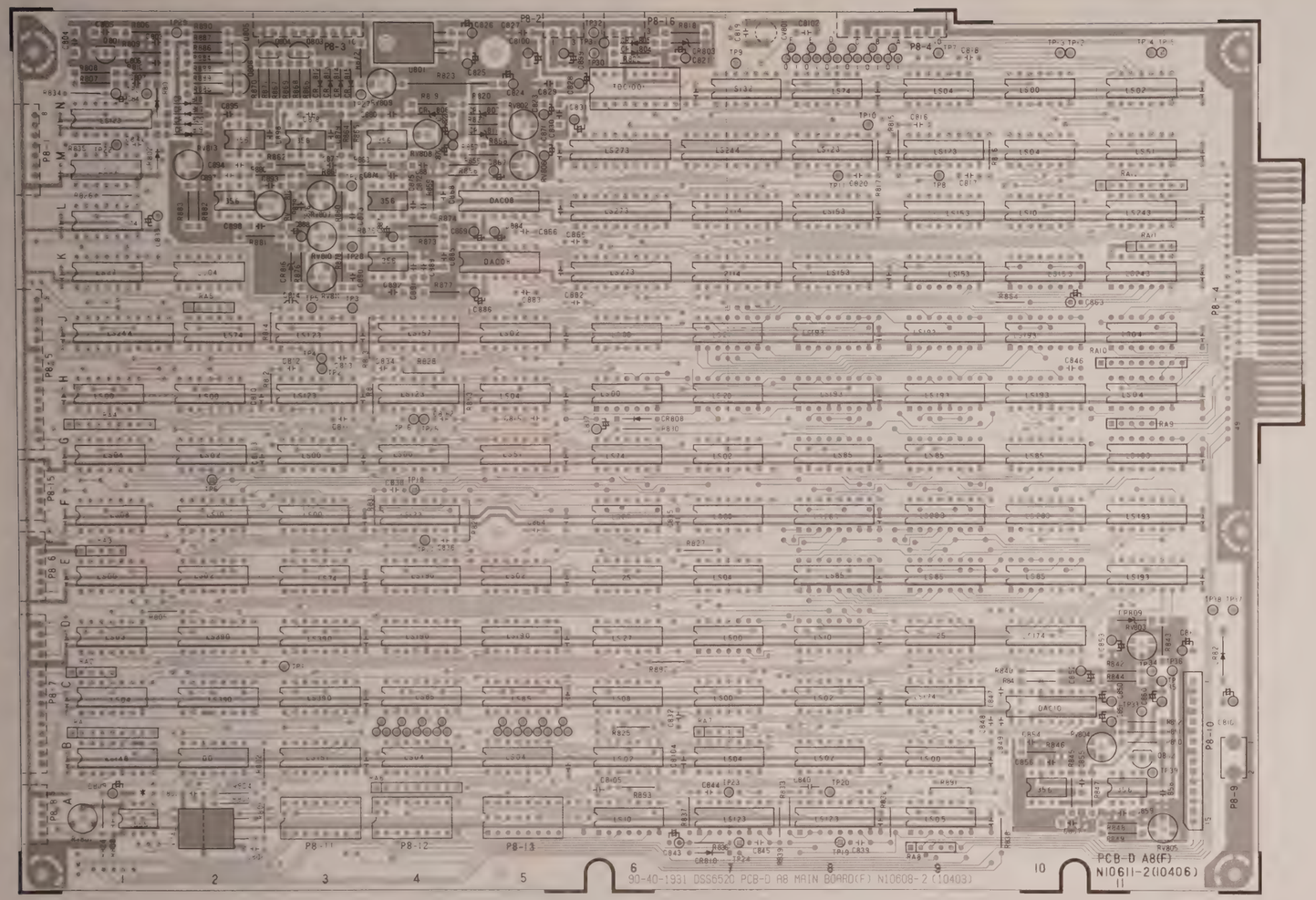
FUSE TYPE 100 3A SB TYPE 200 1,5A SB

KIKUSUI ELECTRONICS CORPORATION

TITLE: DSS 6520 A POWER SUPPLY 4

CODE NO:

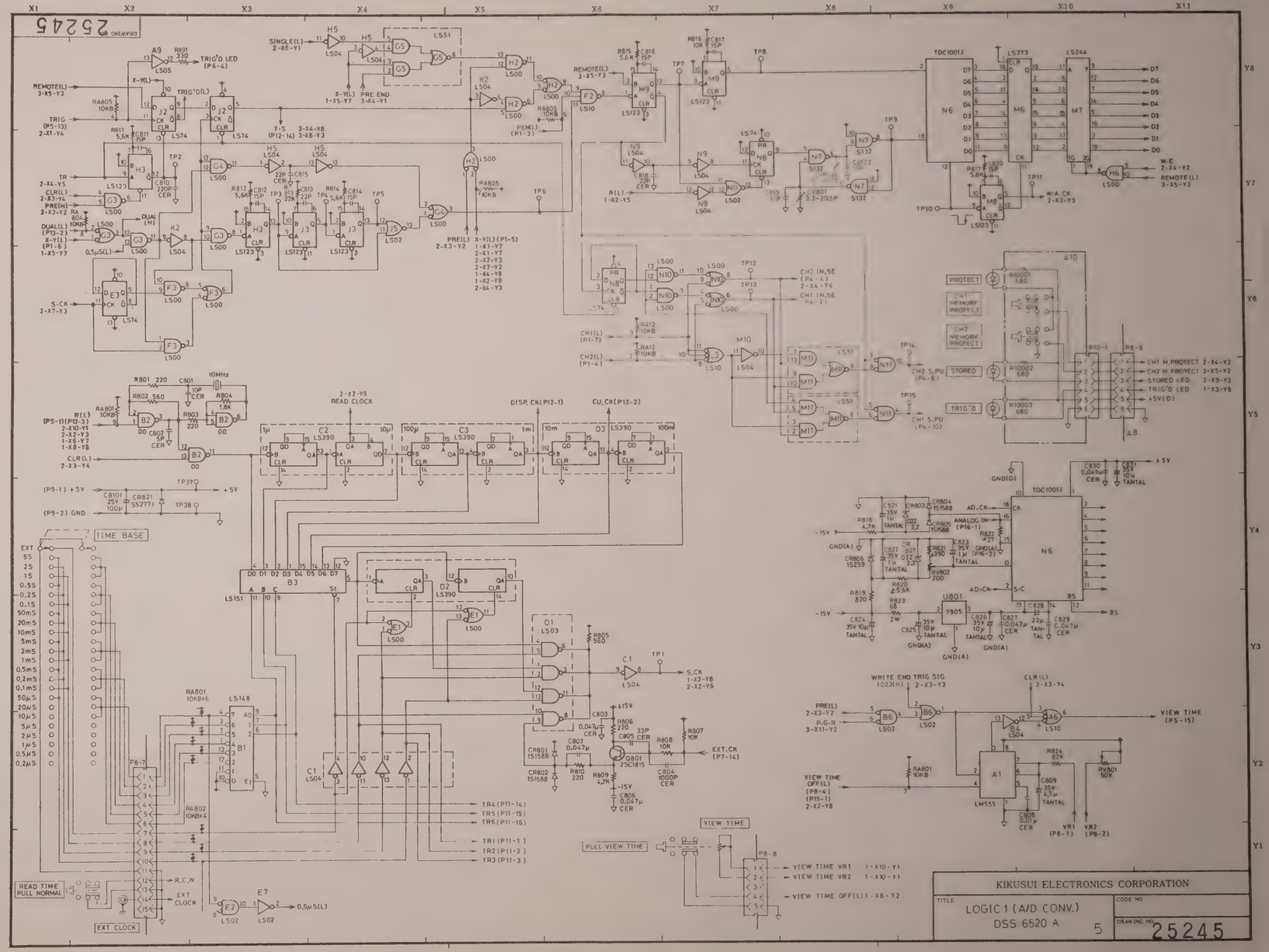
DRAWING: 25244

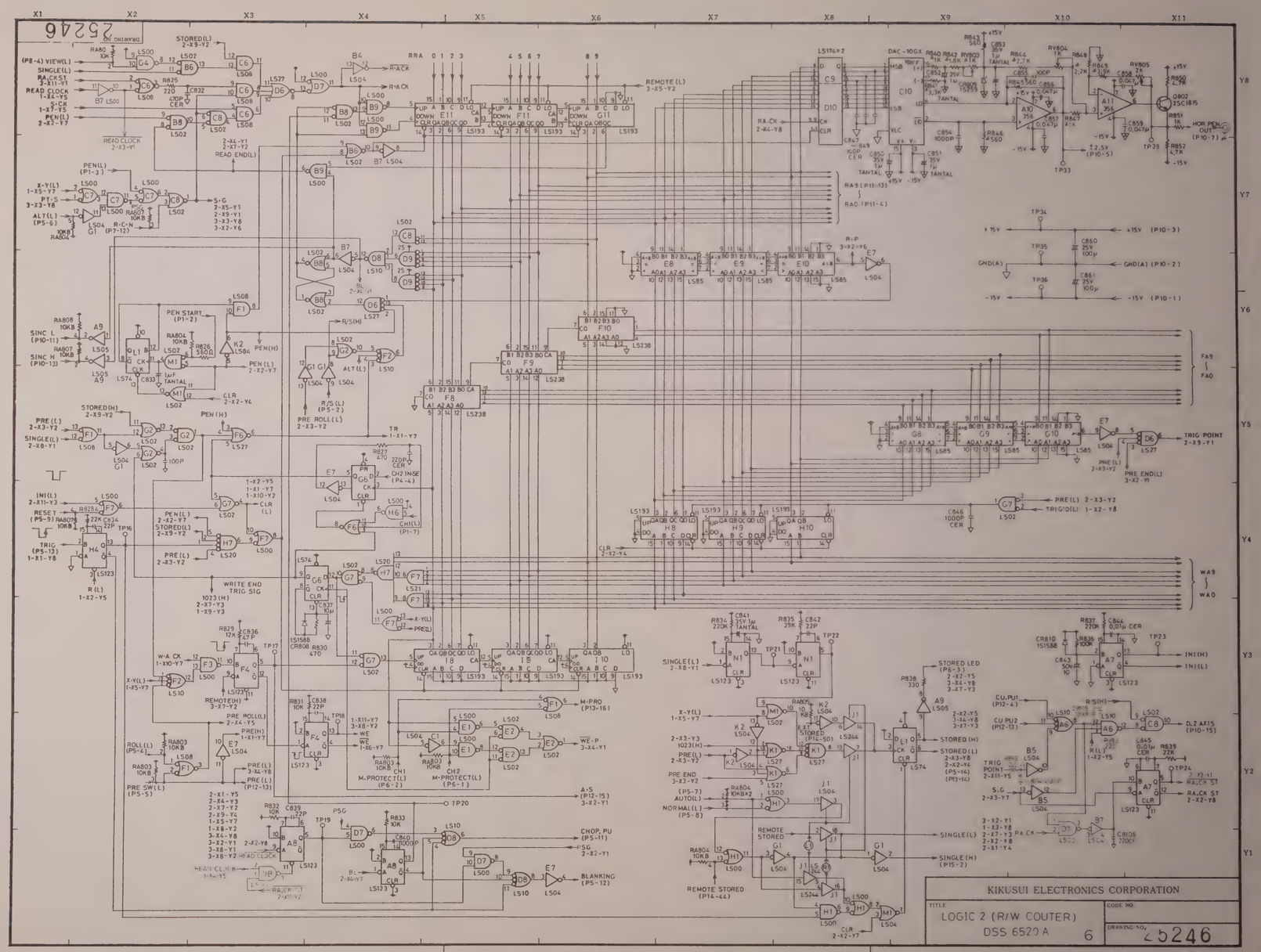


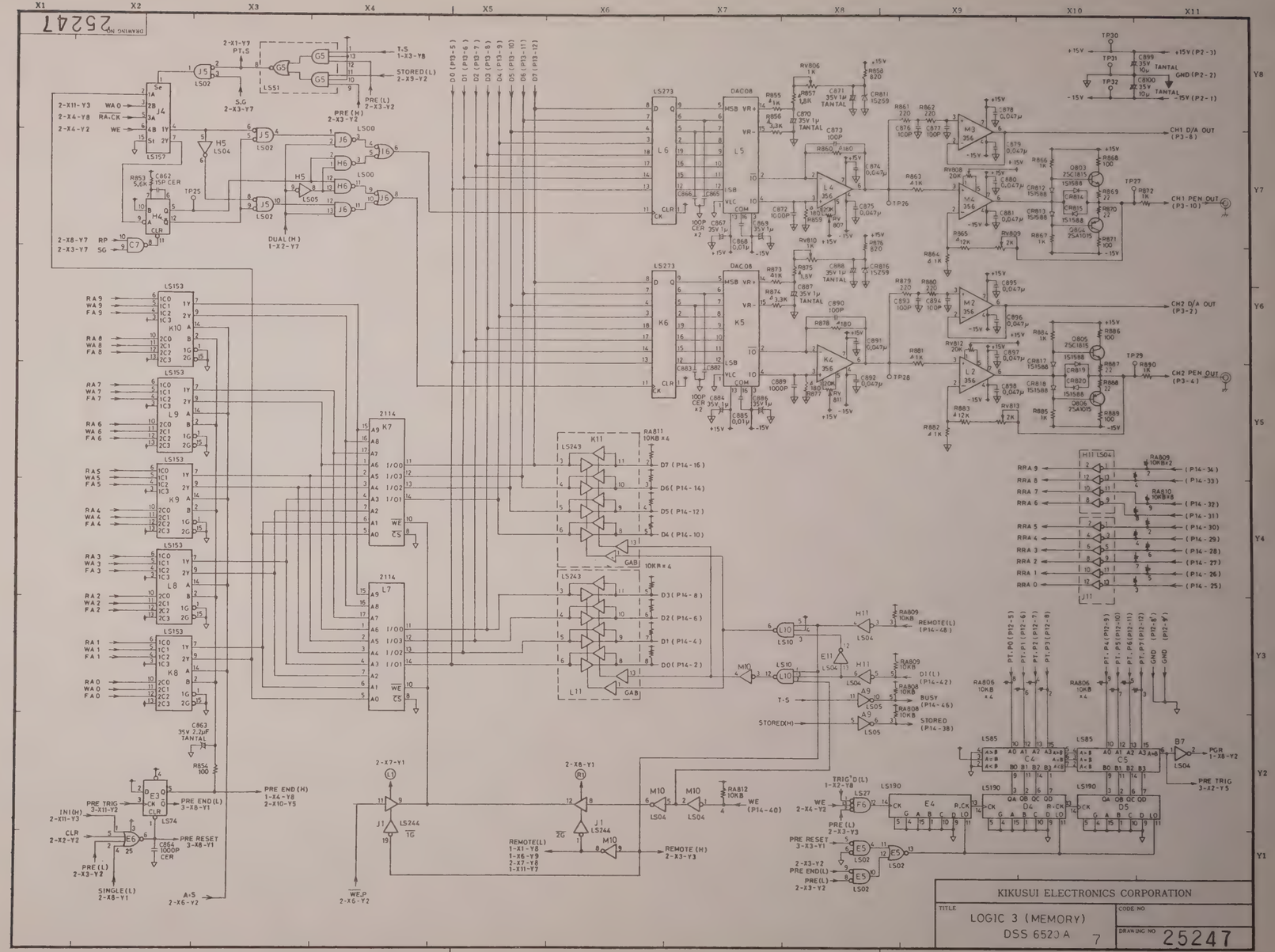
← FRONT

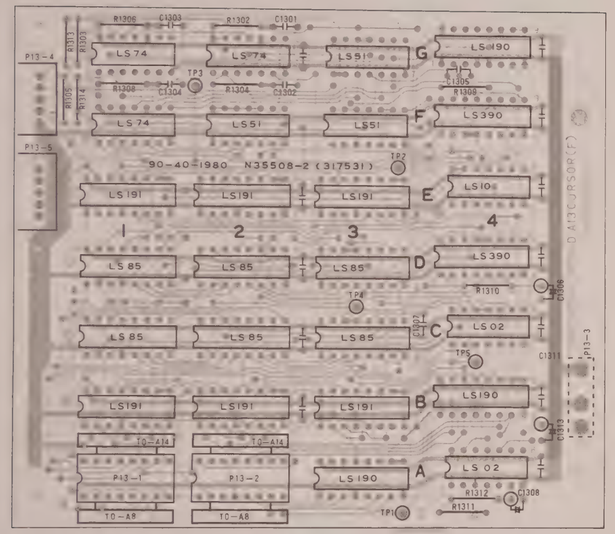
(Parts Side View)

CONTROL A8 PARTS LOCATION DIAGRAM


KIKUSUI ELECTRONICS CORPORATION
TITLE
LOGIC 1 (A/D CONV.)
DSS 6520 A
5
CODE NO.
DRAWING NO.
25245
25245


KIKUSUI ELECTRONICS CORPORATION
TITLE: LOGIC 2 (R/W COUTER)
DSS 6520 A
6
CODE NO.
DRAWING NO. 25246
25246

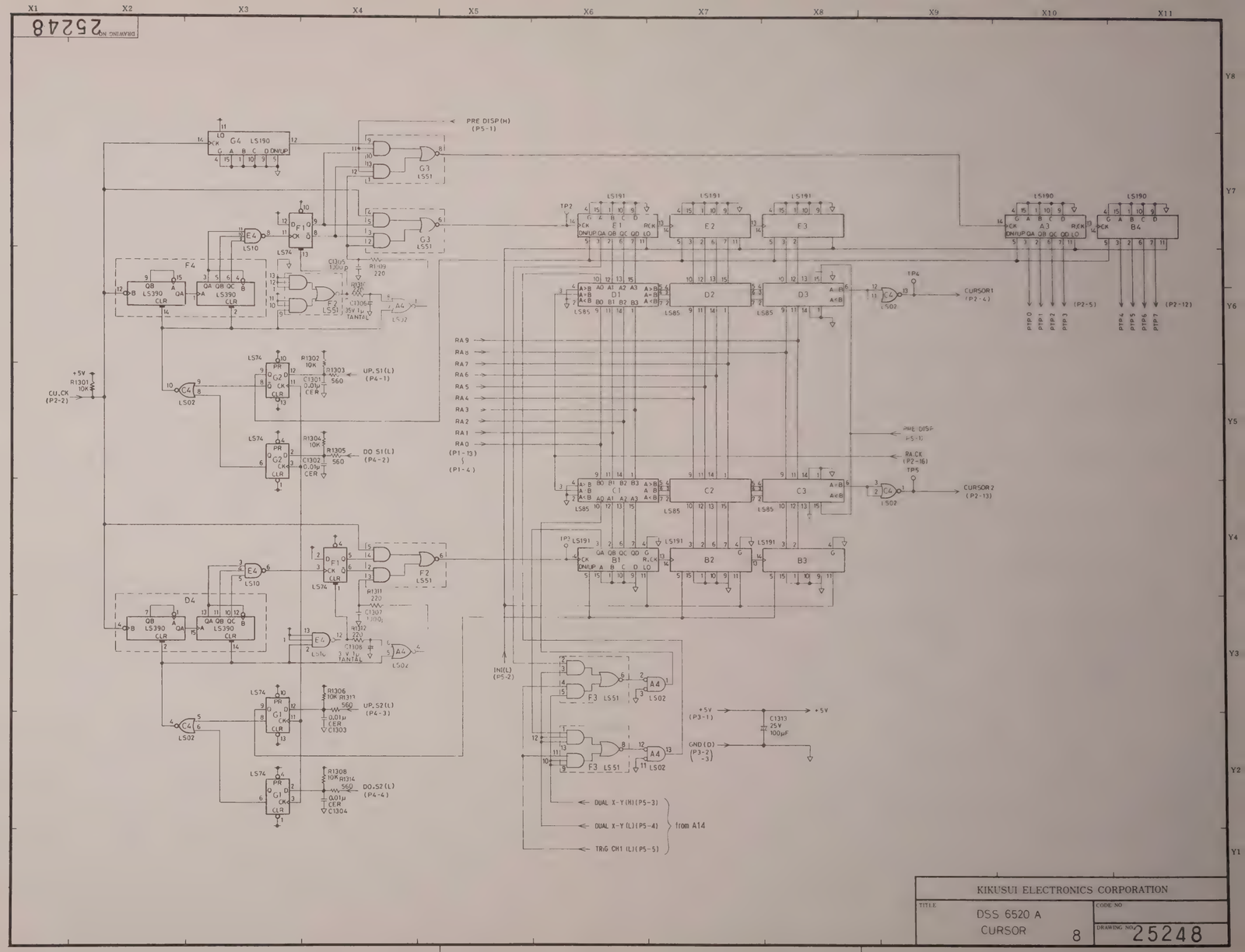

DRAWING NO 25247
KIKUSUI ELECTRONICS CORPORATION
TITLE
LOGIC 3 (MEMORY)
DSS 6520 A 7
CODE NO
DRAWING NO 25247



← FRONT

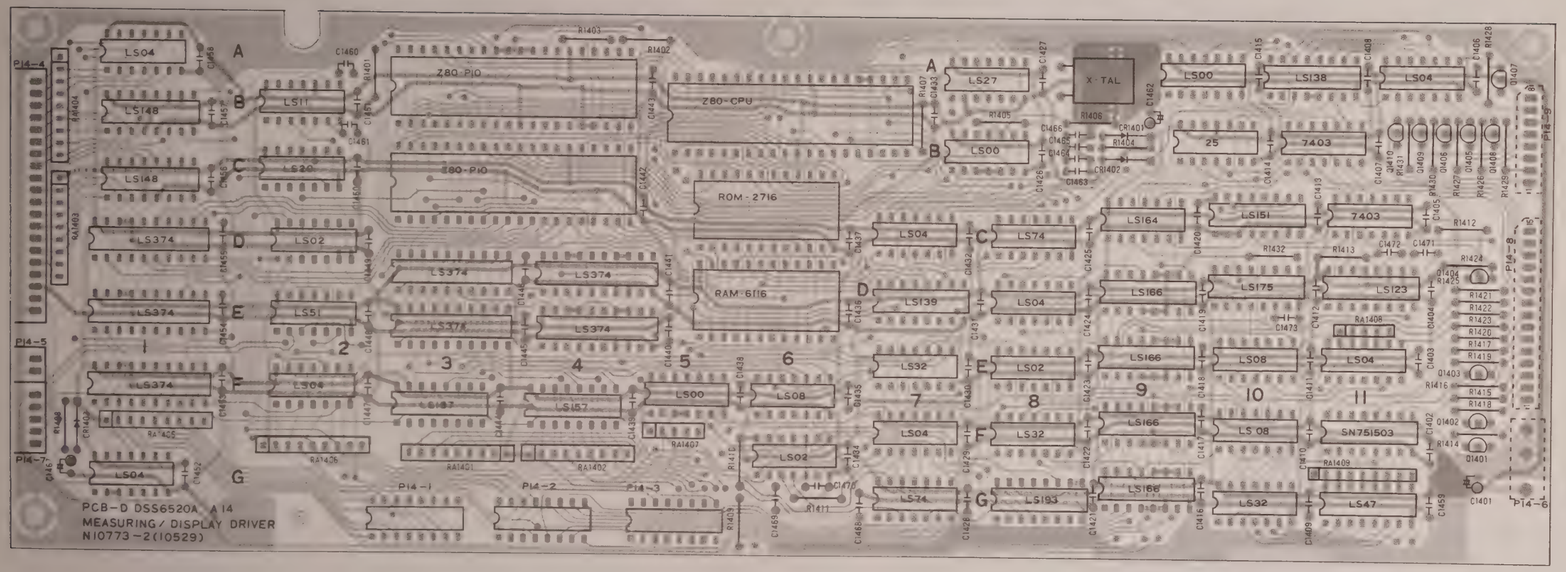
(Parts Side View)

CURSOR A13 PARTS LOCATION DIAGRAM



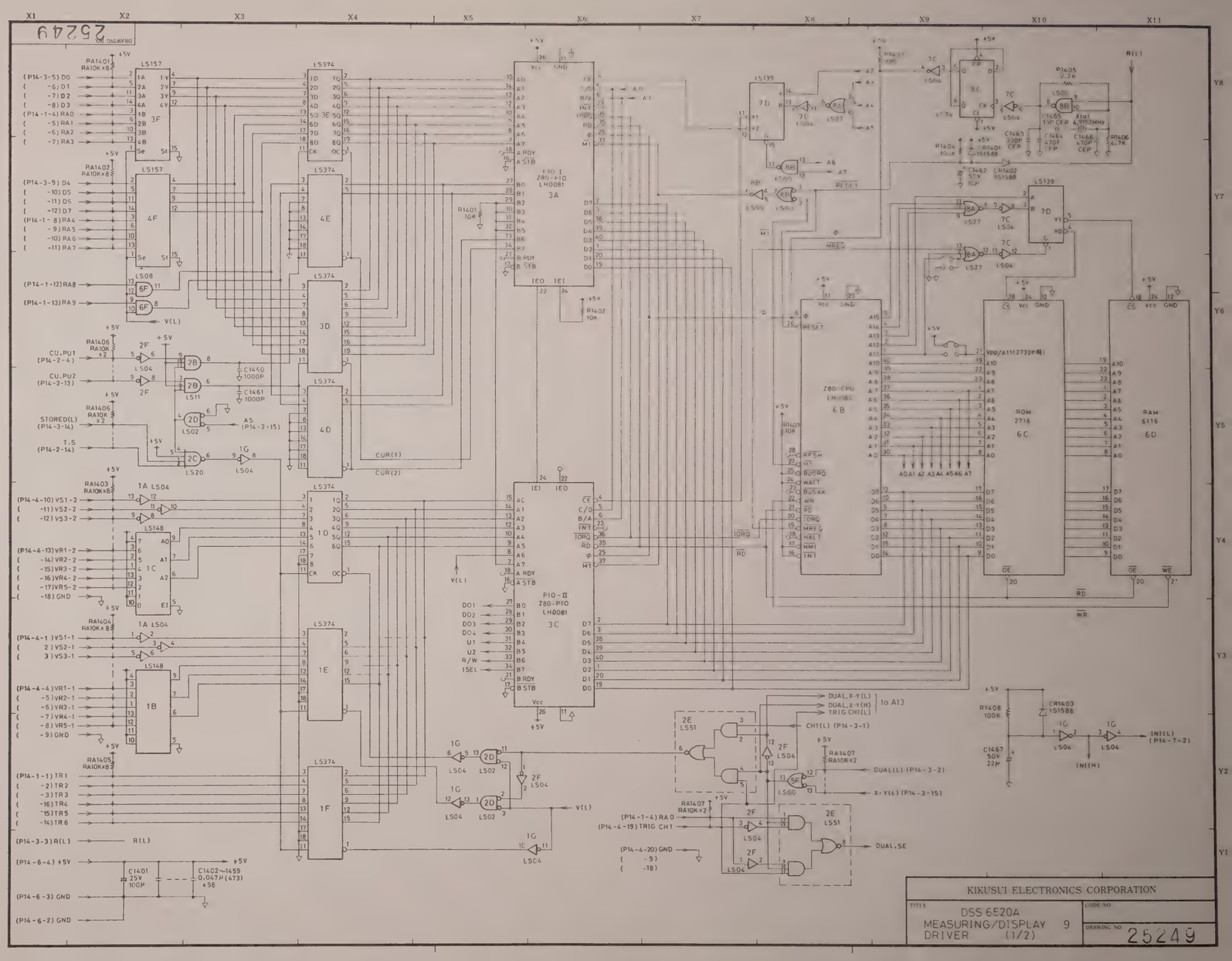
KIKUSUI ELECTRONICS CORPORATION	
TITLE: DSS 6520 A CURSOR 8	CODE NO.
	DRAWING NO. 25248

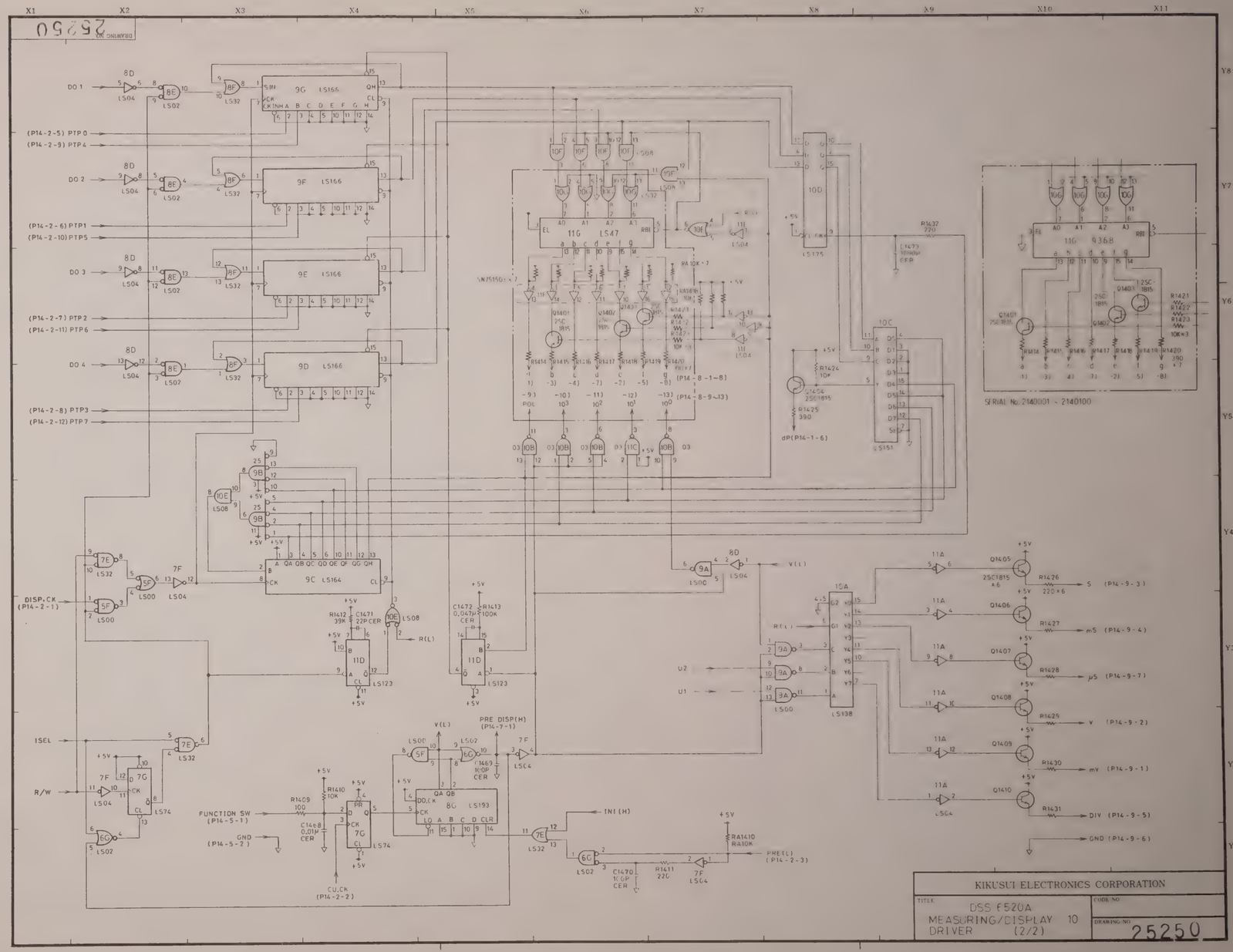
← FRONT



(Parts Side View)

MEASURING UNIT A14 PARTS LOCATION DIAGRAM


KIKUSUI ELECTRONICS CORPORATION
TITLE
DSS 6E20A
MEASURING/DISPLAY DRIVER (1/2)
9
CODE NO.
DRAWING NO.
25249
25249
Z80-CPU LH0080
6B
ROM 2716
6C
RAM 6116
6D
Z80-PIO LH0081
3A
Z80-PIO LH0081
3C
Z80-PIO LH0081
3E
LS157
3F
4F
LS374
4E
3D
4D
1D
1E
1F
LS148
1C
1B
LS139
7D
LS04
LS11
LS02
LS20
LS08
LS00
LS51
LS27
R1401 10K
R1402 10K
R1403 10K
R1404 10K
R1405 7.2K
R1406 4.7K
R1407 10K
R1408 100K
C1401 25V 100μ
C1402~1459 0.047μ(473) +5%
C1440 1000P
C1461 1000P
C1462 50V 10μ
C1463 330P CEP
C1464 470P CEP
C1466 470P CEP
C1467 50V 22μ
X101 4.9152MHz
CR1403 1S1588
V(L)
R(L)
CUR(1)
CUR(2)
AS (P14-2-15)
STORED(L) (P14-3-14)
T.S (P14-2-14)
CU.PU1 (P14-2-4)
CU.PU2 (P14-2-13)
DUAL,X-Y(L)
DUAL,X-Y(H)
TRIG CH1(L)
to A13
CH1(L) (P14-3-1)
DUAL(L) (P14-3-2)
X-Y(L) (P14-3-15)
DUAL,SE
INI(L) (P14-7-2)
INI(H)
(P14-4-19) TRIG CH1
(P14-4-20) GND
(P14-1-4) RA0
(P14-6-4) +5V
(P14-6-3) GND
(P14-6-2) GND
RESET
RD
WR
IORQ
M1
MREQ
RFSH
BUSRQ
WAIT
BUSAK
HALT
NMI
INT


DRAWING NO 25250
DO 1
DO 2
DO 3
DO 4
(P14-2-5) PTP0
(P14-2-9) PTP4
(P14-2-6) PTP1
(P14-2-10) PTP5
(P14-2-7) PTP2
(P14-2-11) PTP6
(P14-2-8) PTP3
(P14-2-12) PTP7
9G LS166
9F LS166
9E LS166
9D LS166
9C LS164
11G LS47
11G 936B
10D LS175
10C LS151
11D LS123
8G LS193
DISP.CK (P14-2-1)
ISEL
R/W
FUNCTION SW (P14-5-1)
GND (P14-5-2)
CU.CK (P14-2-2)
INI(H)
PRE DISP(H) (P14-7-1)
PRE(L) (P14-2-3)
V(L)
R(L)
U2
U1
dP(P14-1-6)
(P14-8-1~8)
(P14-8-9~13)
SERIAL No. 2140001 - 2140100
S (P14-9-3)
mS (P14-9-4)
μS (P14-9-7)
V (P14-9-2)
mV (P14-9-1)
DIV (P14-9-5)
GND (P14-9-6)
KIKUSUI ELECTRONICS CORPORATION
TITLE
DSS F520A
MEASURING/DISPLAY DRIVER (2/2)
CODE NO
DRAWING NO
25250

DRAWING NO. 25251

A8 CONNECTOR LOCATION (R)

P8	
1	VIEW TIME VR1
2	VIEW TIME VR2
3	
4	VIEW TIME OFF(L)
5	GND(D)

P7	
1	T.B 0.1μ
2	T.B 1μ
3	T.B 10μ
4	T.B 100μ
5	T.B 1m
6	T.B 10m
7	EXT
8	1
9	2
10	5
11	GND(D)
12	PR(L)
13	GND(D)
14	EXT CLOCK
15	GND(D)

P6	
1	M PRO CH1(L)
2	M PRO CH2(L)
3	STORED LED
4	TRIG'D LED
5	+5V
6	GND

P15	
1	VIEW TIME OFF(L)
2	SINGL(H)
3	NC
4	NC
5	NC

P5	
1	REAL(L)
2	R/S(L)
3	AUTO ERASE(L)
4	ROLL(L)
5	PRE SW(L)
6	ALT(L)
7	AUTO(L)
8	NORMAL(L)
9	RESET(L)
10	GND(D)
11	CHOP.PU
12	BLANKING
13	OS.TRIG
14	STORED(L)
15	VIEW TIME

P11 (ONLY 6520)			
TR 6	16	1	TR 1
TR 5	15	2	TR 2
TR 4	14	3	TR 3
RA 9	13	4	RA 0
RA 8	12	5	RA 1
RA 7	11	6	RA 2
RA 6	10	7	RA 3
RA 5	9	8	RA 4

P12			
RA.CK	16	1	DISP.CK
INI(L)	15	2	CU.CK
T.S	14	3	PRE(L)
CU.PU2	13	4	CU.PU1
PT.P 7	12	5	PT.P 0
PT.P 6	11	6	PT.P 1
PT.P 5	10	7	PT.P 2
PT.P 4	9	8	PT.P 3

P13 (ONLY 6520)			
CH2(L)	16	1	CH1(L)
X-Y(L)	15	2	DUAL(L)
STORED(L)	14	3	REAL(L)
GND(D)	13	4	GND(L)
DATA 7	12	5	DATA 0
DATA 6	11	6	DATA 1
DATA 5	10	7	DATA 2
DATA 4	9	8	DATA 3

P10	
15	D.ZAXIS
14	GND(A)
13	SINC"L"
12	GND(A)
11	SINC"H"
10	GND(A)
9	Z AXIS
8	GND(A)
7	HOR PEN OUT
6	GND(A)
5	HOR D/A OUT
4	GND(A)
3	+15V
2	GND(A)
1	-15V

P9	
2	GND(D)
1	+5V

P14			
GND(D)	49	50	EXT STORED
GND(D)	47	48	REMOTE(L)
GND(D)	45	46	BUSY
GND(D)	43	44	REMOTE STORE
GND(D)	41	42	DI(L)
GND(D)	39	40	WE
	37	38	STORED(L)
	35	36	
RRA 8	33	34	RRA 9
RRA 6	31	32	RRA 7
RRA 4	29	30	RRA 5
RRA 2	27	28	RRA 3
RRA 0	25	26	RRA 1
	23	24	
	21	22	
	19	20	
GND(D)	17	18	
GND(D)	15	16	D 7
GND(D)	13	14	D 6
GND(D)	11	12	D 5
GND(D)	9	10	D 4
GND(D)	7	8	D 3
GND(D)	5	6	D 2
GND(D)	3	4	D 1
GND(D)	1	2	D 0

P1	
1	GND(D)
2	PEN START(L)
3	PEN(L)
4	CH2(L)
5	X-Y(L)
6	DUAL(L)
7	CH1(L)
8	CAL.CK

P16	
1	ANALOG IN
2	GND(A)
3	GND

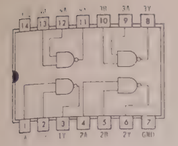
P2	
1	+15V
2	GND
3	-15V

P3	
1	GND(A)
2	CH2 D/A OUT
3	GND(A)
4	CH2 PEN OUT
5	NC
6	NC
7	GND(A)
8	CH1 D/A OUT
9	GND(A)
10	CH1 PEN OUT

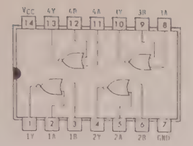
P4	
1	GND(D)
2	CH2 IN.SE
3	GND(D)
4	CH1 IN.SE
5	NC
6	NC
7	GND(D)
8	CH2 S.PV
9	GND(D)
10	CH1 S.PV

KIKUSUI ELECTRONICS CORPORATION

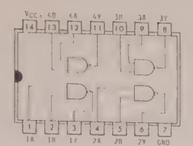
TITLE	CODE NO.
LOGIC 4 (C.LOCATION) DSS 6520A 11	DRAWING 25251



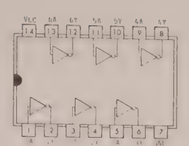
SN7400 SN74LS00
HD7400



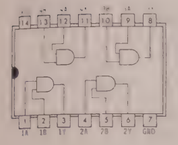
SN74LS02



SN7403 SN74LS03



SN74LS04



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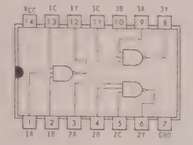

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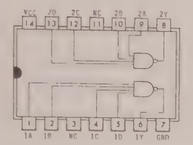
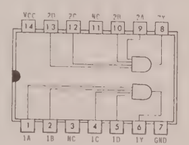


SN74LS20



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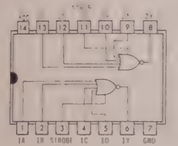
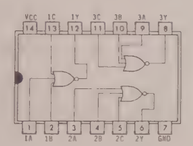


SN7425



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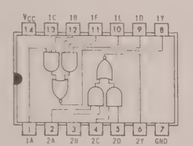

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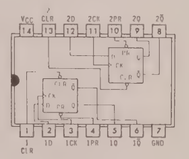
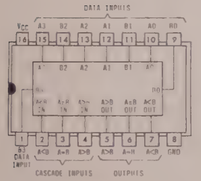
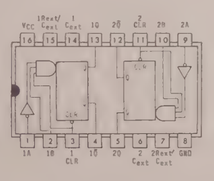


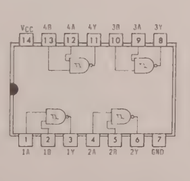
SN74LS74



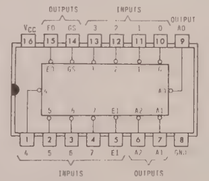
SN74LS85



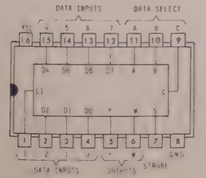
SN74LS123



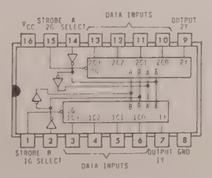
SN74LS132 HD74LS132



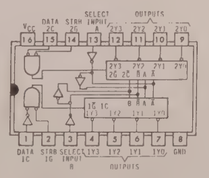
SN74LS148 HD74LS148



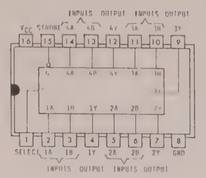
SN74LS151 HD74LS151



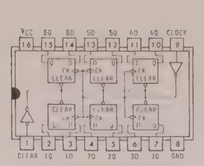
SN74LS153 HD74LS153



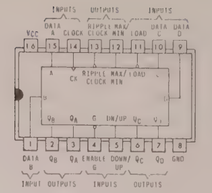
SN74LS156 HD74LS156



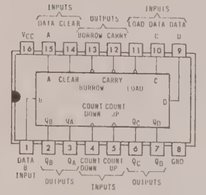
SN74LS157



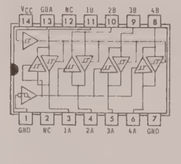
SN74LS174 HD74LS174



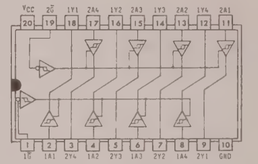
SN74LS190 HD74LS190
SN74LS191 HD74LS191P



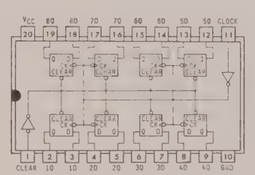
SN74LS193 HD74LS193



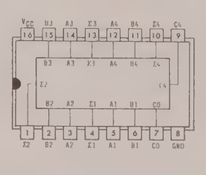
SN74LS243 HD74LS243



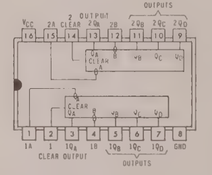
SN74LS244 HD74LS244



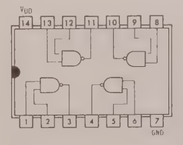
SN74LS273



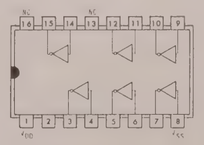
SN74LS283 HD74LS283



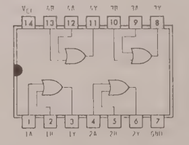
SN74LS390



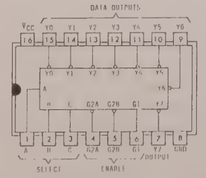
TC4011



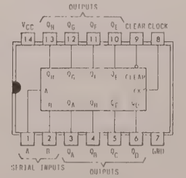
MC14049UBCP TC4049BP



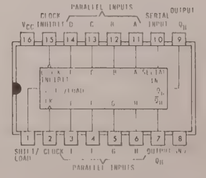
SN74LS32



HD74LS138



HD74LS164P



SN74LS165AN

HN4627166

FET

2SK117
2SK118

3SK59A

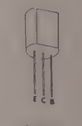
μPA88H

TRANSISTOR

2SA844
2SC1008
2SC1815
2SC1907
2SC2120

2N4258

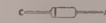
2SA838
2SB946
2SC1843



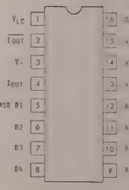
2SB648
2SD401
2SD668

2SA780
2SB834
2SC1505
2SD880

DIODE



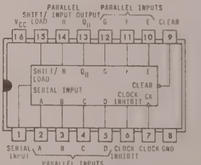
1S1588	HZ5A
1SS83	02BZ3.3
S5277J	02BZ3.9
1SS104	RD5.6JB
1S259	RD6.8JB
HZ36-2	RD24JB



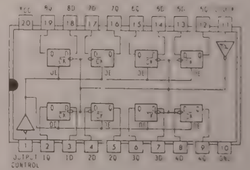
DAC-08

DAC-10

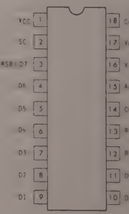
IC (TOP VIEW)



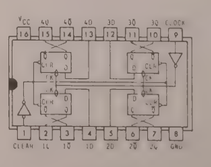
HD74LS166P



SN74LS374

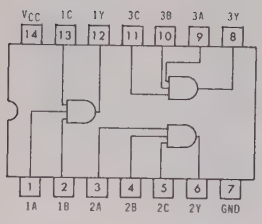


TDC1001J

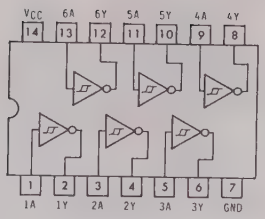


HD74LS175

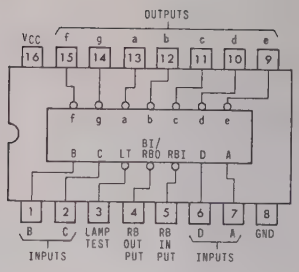
SEMICONDUCTOR LEAD CONFIGURATION (1/2)



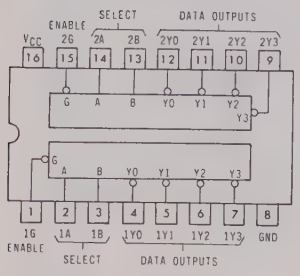
SN74LS11 HD74LS11



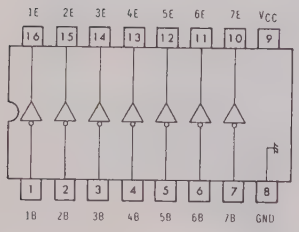
SN74LS14


OUTPUTS
VCC f g a b c d e
16 15 14 13 12 11 10 9
f g a b c d e
BI/
B C LT RBO RBI D A
1 2 3 4 5 6 7 8
B C LAMP TEST RB OUT PUT RB IN PUT D A GND
INPUTS INPUTS

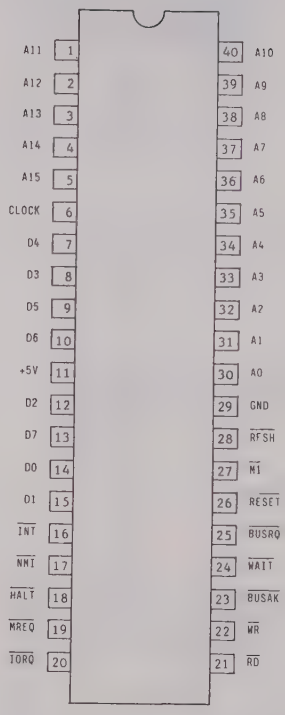
SN74LS47


SELECT
ENABLE DATA OUTPUTS
VCC 2G 2A 2B 2Y0 2Y1 2Y2 2Y3
16 15 14 13 12 11 10 9
G A B Y0 Y1 Y2 Y3
G A B Y0 Y1 Y2 Y3
1 2 3 4 5 6 7 8
1G 1A 1B 1Y0 1Y1 1Y2 1Y3 GND
ENABLE SELECT DATA OUTPUTS

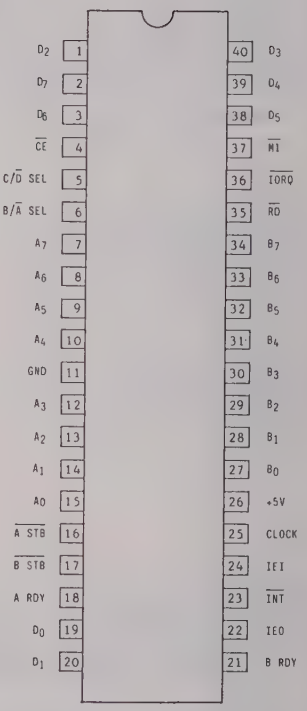
SN74LS139 HD74LS139



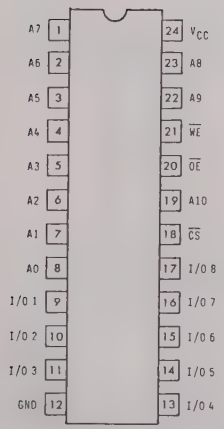
SN751503



LH0080



LH0081



HM6116

SEMICONDUCTOR LEAD CONFIGURATION (2/2)

REPLACEABLE PARTS

ABBREVIATIONS

CER:	CERAMIC
C FILM:	CARBON FILM
C COMP:	CARBON COMPOSITION
CRT:	CATHODE RAY TUBE
ELECT:	ELECTROLYTIC
FET:	FIELD EFFECT TRANSISTOR
FXD:	FIXED
LED:	LIGHT EMITTING DIODE
M FILM:	METAL FILM
M GLAZE:	METAL GLAZE
M OX:	METAL OXIDE
M PLSTC FILM:	METALLIZED PLASTIC FILM
PLSTC FILM:	PLASTIC FILM
Si:	SILICON
TANT ELECT:	TANTALUM ELECTROLYTIC
VAR:	VARIABLE
WW:	WIREWOUND
*:	OPTIMUM VALUE SELECTED AT FACTORY. AVERAGE VALUE SHOWN. (PART MAY BE OMITTED.)

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION

A1 ASSEMBLY

C101	50-87-0500	FXD PLSTC FILM 0.1UF 10% 400V
C101	50-87-0500	FXD PLSTC FILM 0.1UF 10% 400V
C102	52-06-3185	FXD CER 47PF 10% 500V TYPE1
C102	52-06-3185	FXD CER 47PF 10% 500V TYPE1
C103	52-01-3265	FXD CER 220PF 10% 500V TYPE1
C103	52-01-3265	FXD CER 220PF 10% 500V TYPE1
C105	52-06-3030	FXD CER 3PF 10% 500V TYPE1
C105	52-06-3030	FXD CER 3PF 10% 500V TYPE1
C106	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C106	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C107	52-01-3245	FXD CER 150PF 10% 500V TYPE1
C107	52-01-3245	FXD CER 150PF 10% 500V TYPE1
C108	52-01-3285	FXD CER 330PF 10% 500V TYPE1
C108	52-01-3285	FXD CER 330PF 10% 500V TYPE1
C109	50-87-0510	FXD PLSTC FILM 2200PF 20% 400V
C109	50-87-0510	FXD PLSTC FILM 2200PF 20% 400V
C111	54-00-0311	FXD ELECT 10UF 50V
C111	54-00-0311	FXD ELECT 10UF 50V
C112	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C112	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C113	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C113	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C114	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C114	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C115	54-00-0311	FXD ELECT 10UF 50V
C115	54-00-0311	FXD ELECT 10UF 50V
C116	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C116	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C117	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C117	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C118	52-06-3010	FXD CER 1PF 500V TYPE1
C118	52-06-3010	FXD CER 1PF 500V TYPE1
C119	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C119	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C120	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C120	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C121	52-06-3102	FXD CER 10PF 10% 500V TYPE1
C121	52-06-3102	FXD CER 10PF 10% 500V TYPE1
C122	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2
C122	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2
C123	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C123	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C124	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C124	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C125	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C125	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
C126	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C126	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C127	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C127	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C128	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C128	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C129	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C129	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C130	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C130	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C131	50-46-0040	FXD PLSTC FILM 51PF 20% 50V		
C131	50-46-0040	FXD PLSTC FILM 51PF 20% 50V		
C132	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C132	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C133	55-37-2050	FXD TANT ELECT 1UF 35V		
C133	55-37-2050	FXD TANT ELECT 1UF 35V		
C134	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C134	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C135	55-37-2050	FXD TANT ELECT 1UF 35V		
C135	55-37-2050	FXD TANT ELECT 1UF 35V		
C136	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C136	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C139	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C139	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C140	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C140	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C141	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C141	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C142	55-37-2100	FXD TANT ELECT 10UF 35V		
C142	55-37-2100	FXD TANT ELECT 10UF 35V		
C143	52-06-3125	FXD CER 15PF 10% 500V TYPE1		
C143	52-06-3125	FXD CER 15PF 10% 500V TYPE1		
C145	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C145	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1101	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1102	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1103	54-00-0121	FXD ELECT 100UF 25V		
C1104	54-00-0121	FXD ELECT 100UF 25V		
C1105	54-00-0114	FXD ELECT 47UF 25V		
C1106	54-00-0114	FXD ELECT 47UF 25V		
C1107	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1108	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
CR101	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR101	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR102	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR102	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR103	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR103	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR104	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR104	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR105	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR105	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR106	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
CR106	32-90-1710	DIODE VR 30V IO 0.1A	TOSHIBA	1SS104
CR107	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR107	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR108	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR108	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR109	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR109	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR110	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR110	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR111	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR111	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR112	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR112	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR113	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR113	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR114	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR114	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR115	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR115	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR116	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR116	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
CR117	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR117	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR118	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR118	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR120	32-90-0770	ZENER VZ 2.8-3.8V P 250MW	TOSHIBA	02BZ3.3
CR120	32-90-0770	ZENER VZ 2.8-3.8V P 250MW	TOSHIBA	02BZ3.3
CR1101	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
CR1102	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
Q101	31-90-0080	DUAL FET	NEC	UPA68H-M
Q101	31-90-0080	DUAL FET	NEC	UPA68H-M
Q102	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q102	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q103	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q103	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q104	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q104	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q105	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q105	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q106	31-20-1073	FET IDSS 4.5-7.7MA	SONY	2SK107-3
Q106	31-20-1073	FET IDSS 4.5-7.7MA	SONY	2SK107-3
Q107	30-10-5941	TR SI PNP HFE 120-240	TOSHIBA	2SA594-Y
Q107	30-10-5941	TR SI PNP HFE 120-240	TOSHIBA	2SA594-Y
Q108	30-30-5941	TR SI NPN HFE 120-240	TOSHIBA	2SC594-Y
Q108	30-30-5941	TR SI NPN HFE 120-240	TOSHIBA	2SC594-Y
Q109	31-90-0050	FET DUAL IDSS 1-3MA	NEC	UPA61A-L
Q109	31-90-0050	FET DUAL IDSS 1-3MA	NEC	UPA61A-L
Q110	30-10-6031	TR SI PNP HFE 110-170	NEC	2SA603-L
Q110	30-10-6031	TR SI PNP HFE 110-170	NEC	2SA603-L
Q111	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F
Q111	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F
Q112	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F
Q112	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
Q113	30-10-6031	TR SI PNP HFE 110-170	NEC	2SA603-L
Q113	30-10-6031	TR SI PNP HFE 110-170	NEC	2SA603-L
Q114	30-31-0001	TR SI NPN	TOSHIBA	2SC1000GR
Q114	30-31-0001	TR SI NPN	TOSHIBA	2SC1000GR
Q115	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q115	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q116	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q116	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q117	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q117	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q118	30-54-2580	TR SI PNP	FIARCHILD	2N4258
Q118	30-54-2580	TR SI PNP	FIARCHILD	2N4258
Q119	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q119	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q120	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q120	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q121	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F
Q121	30-31-2161	TR SI NPN HFE 100-200	NEC	2SC1216-F
QCR101	30-31-9071	TR SI NPN	HITACHI	2SC1907
QCR101	30-31-9071	TR SI NPN	HITACHI	2SC1907
R103	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R103	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R104	42-74-4900	FXD M FILM 900K OHM 1% 1/2W		
R104	42-74-4900	FXD M FILM 900K OHM 1% 1/2W		
R105	42-72-4111	FXD M FILM 111K OHM 1% 1/4W		
R105	42-72-4111	FXD M FILM 111K OHM 1% 1/4W		
R106	40-27-0822	FXD C FILM 82 OHM 5% 1/4W		
R106	40-27-0822	FXD C FILM 82 OHM 5% 1/4W		
R107	42-74-4990	FXD M FILM 990K OHM 1% 1/2W		
R107	42-74-4990	FXD M FILM 990K OHM 1% 1/2W		
R108	42-72-3101	FXD M FILM 10.1K OHM 1% 1/4W		
R108	42-72-3101	FXD M FILM 10.1K OHM 1% 1/4W		
R109	40-27-0152	FXD C FILM 15 OHM 5% 1/4W		
R109	40-27-0152	FXD C FILM 15 OHM 5% 1/4W		
R110	42-74-5100	FXD M FILM 1M OHM 1% 1/2W		
R110	42-74-5100	FXD M FILM 1M OHM 1% 1/2W		
R111	42-72-2100	FXD M FILM 1K OHM 1% 1/4W		
R111	42-72-2100	FXD M FILM 1K OHM 1% 1/4W		
R112	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R112	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R113	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R113	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R114	42-74-5100	FXD M FILM 1M OHM 1% 1/2W		
R114	42-74-5100	FXD M FILM 1M OHM 1% 1/2W		
R115	40-37-4471	FXD C FILM 470K OHM 5% 1/2W		
R115	40-37-4471	FXD C FILM 470K OHM 5% 1/2W		
R116	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R116	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R117	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R117	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R118	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		
R118	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R119	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R119	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R120	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R120	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R121	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R121	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R122	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R122	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R123	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R123	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R124	40-27-3122	FXD C FILM 12K OHM 5% 1/4W
R124	40-27-3122	FXD C FILM 12K OHM 5% 1/4W
R125	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R125	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R126	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R126	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R127	40-27-1152	FXD C FILM 150 OHM 5% 1/4W
R127	40-27-1152	FXD C FILM 150 OHM 5% 1/4W
R128	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R128	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R129	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R129	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R130	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R130	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R131	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R131	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R132	40-27-0272	FXD C FILM 27 OHM 5% 1/4W
R132	40-27-0272	FXD C FILM 27 OHM 5% 1/4W
R133	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R133	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R134	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R134	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R136	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R136	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R137	42-72-0560	FXD M FILM 56 OHM 1% 1/4W
R137	42-72-0560	FXD M FILM 56 OHM 1% 1/4W
R138	40-27-8472	FXD C FILM 4.7 OHM 5% 1/4W
R138	40-27-8472	FXD C FILM 4.7 OHM 5% 1/4W
R139	42-72-0560	FXD M FILM 56 OHM 1% 1/4W
R139	42-72-0560	FXD M FILM 56 OHM 1% 1/4W
R140	42-72-1820	FXD M FILM 820 OHM 1% 1/4W
R140	42-72-1820	FXD M FILM 820 OHM 1% 1/4W
R141	42-72-1220	FXD M FILM 220 OHM 1% 1/4W
R141	42-72-1220	FXD M FILM 220 OHM 1% 1/4W
R142	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R142	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R143	40-27-0822	FXD C FILM 82 OHM 5% 1/4W
R143	40-27-0822	FXD C FILM 82 OHM 5% 1/4W
R144	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R144	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R145	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R145	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R146	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R146	40-27-1102	FXD C FILM 100 OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R147	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R147	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R148	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R148	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R149	40-27-3682	FXD C FILM 68 OHM 5% 1/4W
R149	40-27-3682	FXD C FILM 68 OHM 5% 1/4W
R150	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R150	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R151	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R151	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R152	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R152	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R153	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R153	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R154	40-27-3220	FXD C FILM 22 OHM 5% 1/4W
R154	40-27-3220	FXD C FILM 22 OHM 5% 1/4W
R155	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R155	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R156	40-27-3220	FXD C FILM 22 OHM 5% 1/4W
R156	40-27-3220	FXD C FILM 22 OHM 5% 1/4W
R157	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R157	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R158	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R158	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R159	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R159	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R160	42-72-2820	FXD M FILM 8.2K OHM 1% 1/4W
R160	42-72-2820	FXD M FILM 8.2K OHM 1% 1/4W
R161	42-72-2680	FXD M FILM 6.8K OHM 1% 1/4W
R161	42-72-2680	FXD M FILM 6.8K OHM 1% 1/4W
R162	42-72-1510	FXT M FILM 510 OHM 1% 1/4W
R162	42-72-1510	FXT M FILM 510 OHM 1% 1/4W
R163	42-72-2390	FXD M FILM 3.9K OHM 1% 1/4W
R163	42-72-2390	FXD M FILM 3.9K OHM 1% 1/4W
R164	42-72-1510	FXT M FILM 510 OHM 1% 1/4W
R164	42-72-1510	FXT M FILM 510 OHM 1% 1/4W
R165	40-27-4472	FXD C FILM 470K OHM 5% 1/4W
R165	40-27-4472	FXD C FILM 470K OHM 5% 1/4W
R166	40-27-3472	FXD C FILM 47K OHM 5% 1/4W
R166	40-27-3472	FXD C FILM 47K OHM 5% 1/4W
R167	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R167	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R168	42-72-2200	FXD M FILM 2K OHM 1% 1/4W
R168	42-72-2200	FXD M FILM 2K OHM 1% 1/4W
R169	42-72-2200	FXD M FILM 2K OHM 1% 1/4W
R169	42-72-2200	FXD M FILM 2K OHM 1% 1/4W
R170	42-72-3100	FXD M FILM 10K OHM 1% 1/4W
R170	42-72-3100	FXD M FILM 10K OHM 1% 1/4W
R171	42-72-3180	FXD M FILM 18K OHM 1% 1/4W
R171	42-72-3180	FXD M FILM 18K OHM 1% 1/4W
R172	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R172	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R173	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R173	42-72-2100	FXD M FILM 1K OHM 1% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R174	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R174	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R175	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R175	42-72-2120	FXD M FILM 1.2K OHM 1% 1/4W
R176	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R176	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R177	42-72-1150	FXD M FILM 150 OHM 1% 1/4W
R177	42-72-1150	FXD M FILM 150 OHM 1% 1/4W
R178	42-72-1330	FXD M FILM 330 OHM 1% 1/4W
R178	42-72-1330	FXD M FILM 330 OHM 1% 1/4W
R179	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R179	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R180	40-27-1100	FXD C FILM 100 OHM 5% 1/4W
R180	40-27-1100	FXD C FILM 100 OHM 5% 1/4W
R181	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R181	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R182	40-27-1100	FXD C FILM 100 OHM 5% 1/4W
R182	40-27-1100	FXD C FILM 100 OHM 5% 1/4W
R183	42-72-1270	FXD M FILM 270 OHM 1% 1/4W
R183	42-72-1270	FXD M FILM 270 OHM 1% 1/4W
R184	42-72-1470	FXD M FILM 470 OHM 1% 1/4W
R184	42-72-1470	FXD M FILM 470 OHM 1% 1/4W
R185	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R185	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R186	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R186	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R187	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R187	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R188	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R188	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R189	40-27-2682	FXD C FILM 6.8K OHM 5% 1/4W
R189	40-27-2682	FXD C FILM 6.8K OHM 5% 1/4W
R190	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R190	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R191	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R191	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R192	40-27-0330	FXD C FILM 33 OHM 5% 1/4W
R192	40-27-0330	FXD C FILM 33 OHM 5% 1/4W
R193	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R193	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R194	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R194	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R195	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R195	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R196	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R196	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R197	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R197	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R198	40-27-1392	FXD C FILM 390 OHM 5% 1/4W
R198	40-27-1392	FXD C FILM 390 OHM 5% 1/4W
R199	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W
R199	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W
R1100	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W
R1100	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION			
R1101	40-27-1392	FXD C FILM	390	OHM 5% 1/4W	
R1101	40-27-1392	FXD C FILM	390	OHM 5% 1/4W	
R1102	40-27-2102	FXD C FILM	1K	OHM 5% 1/4W	
R1102	40-27-2102	FXD C FILM	1K	OHM 5% 1/4W	
R1103	40-27-2102	FXD C FILM	1K	OHM 5% 1/4W	
R1103	40-27-2102	FXD C FILM	1K	OHM 5% 1/4W	
R1104	40-27-1822	FXD C FILM	820	OHM 5% 1/4W	
R1104	40-27-1822	FXD C FILM	820	OHM 5% 1/4W	
R1106	42-72-3150	FXD M FILM	15K	OHM 1% 1/4W	
R1107	40-27-8472	FXD C FILM	4.7	OHM 5% 1/4W	
R1107	40-27-8472	FXD C FILM	4.7	OHM 5% 1/4W	
R1108	40-27-8472	FXD C FILM	4.7	OHM 5% 1/4W	
R1108	40-27-8472	FXD C FILM	4.7	OHM 5% 1/4W	
R1109	40-27-1102	FXD C FILM	100	OHM 5% 1/4W	
R1109	40-27-1102	FXD C FILM	100	OHM 5% 1/4W	
R1110	40-27-1822	FXD C FILM	820	OHM 5% 1/4W	
R1110	40-27-1822	FXD C FILM	820	OHM 5% 1/4W	
R1111	40-27-2222	FXD C FILM	2.2K	OHM 5% 1/4W	
R1111	40-27-2222	FXD C FILM	2.2K	OHM 5% 1/4W	
R1112	40-27-2222	FXD C FILM	2.2K	OHM 5% 1/4W	
R1112	40-27-2222	FXD C FILM	2.2K	OHM 5% 1/4W	
RV101	48-33-3100	VAR M FILM	10K	OHM	
RV101	48-33-3100	VAR M FILM	10K	OHM	
RV103	48-33-1100	VAR M FILM	100	OHM	
RV103	48-33-1100	VAR M FILM	100	OHM	
RV104	48-33-1100	VAR M FILM	100	OHM	
RV104	48-33-1100	VAR M FILM	100	OHM	
RV105	48-33-3200	VAR M FILM	20K	OHM	
RV105	48-33-3200	VAR M FILM	20K	OHM	
RV106	48-33-2200	VAR M FILM	2K	OHM	
RV106	48-33-2200	VAR M FILM	2K	OHM	
RV107	48-33-2100	VAR M FILM	1K	OHM	
RV107	48-33-2100	VAR M FILM	1K	OHM	
RV108	48-33-3200	VAR M FILM	20K	OHM	
RV108	48-33-3200	VAR M FILM	20K	OHM	
RV109	48-33-3200	VAR M FILM	20K	OHM	
RV109	48-33-3200	VAR M FILM	20K	OHM	
RV110	48-33-2500	VAR M FILM	5K	OHM	
RV110	48-33-2500	VAR M FILM	5K	OHM	
RV111	48-33-1500	VAR M FILM	500	OHM	
RV111	48-33-1500	VAR M FILM	500	OHM	
RV112	48-33-1200	VAR M FILM	200	OHM	
RV112	48-33-1200	VAR M FILM	200	OHM	
RV113	48-33-1100	VAR M FILM	100	OHM	
RV113	48-33-1100	VAR M FILM	100	OHM	
RV114	48-33-1200	VAR M FILM	200	OHM	
RV114	48-33-1200	VAR M FILM	200	OHM	
S	80-10-4040	ROTARY SWITCH	VOLTS/DIV		
S	82-70-8221	LEVER SWITCH		ALPS	SLR822-1
S	82-70-8231	LEVER SWITCH		ALPS	SLR823-1
S	80-10-4040	ROTARY SWITCH	VOLTS/DIV		
S	82-70-8231	LEVER SWITCH		ALPS	SLR823-1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
T101	65-13-0050	PULSE TRANS 12365,KP51		
T101	65-13-0050	PULSE TRANS 12365,KP51		
U101	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U101	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U102	34-00-0221	FET OPE-AMP	N.S	LF357
U102	34-00-0221	FET OPE-AMP	N.S	LF357
U103	34-00-0221	FET OPE-AMP	N.S	LF357
U103	34-00-0221	FET OPE-AMP	N.S	LF357
U104	34-00-0111	FET OPE-AMP	N.S	LF356N
U104	34-00-0111	FET OPE-AMP	N.S	LF356N
U105	34-60-0010	DIODE ARRAY	RCA	CA3019
U105	34-60-0010	DIODE ARRAY	RCA	CA3019
U106	34-10-0000	VOLTAGE FOLLOWER AMP	TOSHIBA	TL068CLP
U106	34-10-0000	VOLTAGE FOLLOWER AMP	TOSHIBA	TL068CLP
U107	34-10-0000	VOLTAGE FOLLOWER AMP	TOSHIBA	TL068CLP
U107	34-10-0000	VOLTAGE FOLLOWER AMP	TOSHIBA	TL068CLP

A2 ASSEMBLY

C201	54-00-0121	FXD ELECT 100UF 25V
C202	54-00-0121	FXD ELECT 100UF 25V
C203	54-00-0121	FXD ELECT 100UF 25V
C204	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C205	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C206	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C209	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C210	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C211	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C212	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C213	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C216	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C217	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C218	55-37-2100	FXD TANT ELECT 10UF 35V
C219	55-37-2100	FXD TANT ELECT 10UF 35V
C222	54-00-0311	FXD ELECT 10UF 50V
C223	54-00-0311	FXD ELECT 10UF 50V
C224	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C225	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C226	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C227	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C228	55-37-2100	FXD TANT ELECT 10UF 35V
C229	54-00-0311	FXD ELECT 10UF 50V
C230	54-00-0311	FXD ELECT 10UF 50V
C231	55-37-2100	FXD TANT ELECT 10UF 35V
C232	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C233	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C234	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C235	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C236	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C237	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C238	52-06-3051	FXD CER 5PF 10% 500V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
C240	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C241	52-37-1005	FXD CER 0.047UF 20% 25V TYPE1		
C242	52-01-2225	FXD CER 100PF 10% 50V TYPE2		
C243	54-06-0301	FXD ELECT 1UF 50V		
C244	54-06-0311	FXD ELECT 10UF 50V		
C245	54-06-0301	FXD ELECT 1UF 50V		
C246	54-06-0301	FXD ELECT 1UF 50V		
C247	50-45-0502	FXD PLSTC FILM 0.01MF 5% 50V		
C248	50-45-0502	FXD PLSTC FILM 0.01MF 5% 50V		
C249	54-06-0311	FXD ELECT 10UF 50V		
CR201	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR202	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR203	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR204	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR205	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR206	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR207	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR208	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR209	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR210	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR211	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR212	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR213	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR214	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR215	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR216	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR217	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR218	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR219	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR220	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR221	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR222	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR223	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR224	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CV201	57-10-1150	VAR CER 25-22.5PF		
CV202	57-10-1150	VAR CER 25-22.5PF		
CV203	57-10-1150	VAR CER 25-22.5PF		
Q201	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q202	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q203	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q204	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q205	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q206	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q207	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q208	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q209	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q210	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q211	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q212	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q213	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q214	30-31-9071	TR SI NPN	HITACHI	2SC1907

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
Q215	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q216	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q217	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q218	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q219	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q220	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q221	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q222	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q223	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q224	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q225	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q226	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q227	30-10-8441	TR SI PNP	HITACHI	2SA844-D
R201	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R202	42-72-1390	FXD M FILM 390 OHM 1% 1/4W		
R203	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R204	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R205	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R206	40-27-2102	FXD C FILM 1K OHM 5% 1/4W		
R207	40-27-0152	FXD C FILM 15 OHM 5% 1/4W		
R208	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R209	40-27-2102	FXD C FILM 1K OHM 5% 1/4W		
R210	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R211	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R212	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R213	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R214	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W		
R215	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R216	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R218	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W		
R220	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R221	40-27-1122	FXD C FILM 120 OHM 5% 1/4W		
R222	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R223	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W		
R224	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R225	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R226	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R227	40-27-0562	FXD C FILM 56 OHM 5% 1/4W		
R228	40-27-0562	FXD C FILM 56 OHM 5% 1/4W		
R229	40-27-0103	FXD C FILM 10 OHM 5% 1/4W		
R230	42-72-1390	FXD M FILM 390 OHM 1% 1/4W		
R231	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R232	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R233	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R234	40-27-2102	FXD C FILM 1K OHM 5% 1/4W		
R235	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R236	40-27-0822	FXD C FILM 82 OHM 5% 1/4W		
R237	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R238	40-27-2102	FXD C FILM 1K OHM 5% 1/4W		
R239	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R240	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R241	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R242	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R244	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R245	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R246	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R247	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R249	40-27-1122	FXD C FILM 120 OHM 5% 1/4W
R250	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R251	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R252	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R253	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R254	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R255	40-27-0562	FXD C FILM 56 OHM 5% 1/4W
R256	40-27-0562	FXD C FILM 56 OHM 5% 1/4W
R257	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R258	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R259	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R260	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R261	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R262	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R263	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R264	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R265	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R266	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R267	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R268	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R269	40-27-3272	FXD C FILM 27K OHM 5% 1/4W
R270	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R271	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R272	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R273	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R274	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R275	40-27-1182	FXD C FILM 180 OHM 5% 1/4W
R276	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R277	42-72-1390	FXD M FILM 390 OHM 1% 1/4W
R278	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R279	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R280	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R281	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R282	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R283	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R284	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R285	40-27-3122	FXD C FILM 12K OHM 5% 1/4W
R286	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R287	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R288	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R289	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R290	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R291	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R292	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R293	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R294	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R295	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R296	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R297	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R298	40-27-0102	FXD C FILM 10 OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R299	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R2100	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R2111	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R2112	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R2113	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R2114	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R2115	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R2116	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R2117	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R2118	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R2119	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R2120	40-27-3272	FXD C FILM 27K OHM 5% 1/4W
R2121	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2122	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2123	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R2124	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R2125	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R2126	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R2127	40-27-3122	FXD C FILM 12K OHM 5% 1/4W
R2128	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R2129	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R2130	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R2131	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R2132	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R2133	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R2134	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R2135	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R2136	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R2137	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R2138	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R2139	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R2140	42-72-2390	FXD M FILM 3.9K OHM 1% 1/4W
R2141	42-72-2390	FXD M FILM 3.9K OHM 1% 1/4W
R2142	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R2143	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R2144	42-72-1270	FXD M FILM 270 OHM 1% 1/4W
R2145	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R2146	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R2147	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R2148	40-27-3222	FXD C FILM 22K OHM 5% 1/4W
R2149	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R2150	40-27-0272	FXD C FILM 27 OHM 5% 1/4W
R2151	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R2152	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R2153	40-27-0220	FXD C FILM 22 OHM 5% 1/4W
R2154	42-72-1270	FXD M FILM 270 OHM 1% 1/4W
R2155	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R2156	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R2157	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R2158	40-27-0152	FXD C FILM 15 OHM 5% 1/4W
R2160	40-27-0000	JUMPER PARTS
R2161	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R2162	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R2163	40-27-0472	FXD C FILM 47 OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R2164	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2165	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R2166	42-72-2270	FXD M FILM 2.7K OHM 1% 1/4W
R2167	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R2168	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R2169	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R2170	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2171	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2172	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2173	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2174	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2175	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2176	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2177	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R2178	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R2179	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R2180	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R2181	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2182	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2183	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2184	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2185	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2186	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2187	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2188	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2189	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R2190	40-27-3682	FXD C FILM 68K OHM 5% 1/4W
R2191	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2192	40-27-4222	FXD C FILM 220K OHM 5% 1/4W
R2193	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R2194	40-27-3682	FXD C FILM 68K OHM 5% 1/4W
R2195	40-27-4102	FXD C FILM 100K OHM 5% 1/4W
R2196	40-27-4472	FXD C FILM 470K OHM 5% 1/4W
R2197	40-27-4102	FXD C FILM 100K OHM 5% 1/4W
R2198	42-72-3115	FXD M FILM 11.5K OHM 1% 1/4W
R2199	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R2200	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R2201	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R2202	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R2203	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R2204	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R2205	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
RA201	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8
RV201	48-31-1100	VAR M GLAZE 100 OHM B PH
RV202	48-31-2100	VAR M GLAZE 1K OHM B PH
RV203	48-31-1100	VAR M GLAZE 100 OHM B PH
RV204	48-31-2100	VAR M GLAZE 1K OHM B PH
RV205	48-31-1100	VAR M GLAZE 100 OHM B PH
RV206	48-31-1200	VAR M GLAZE 200 OHM B
RV207	48-31-1100	VAR M GLAZE 100 OHM B PH
RV208	48-31-2100	VAR M GLAZE 1K OHM B PH
RV210	48-31-2200	VAR M GLAZE 2K OHM B PH

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
RV211	48-31-1200	VAR M GLAZE 200 OHM B		
RV212	48-31-2200	VAR M GLAZE 2K OHM B PH		
RV214	48-31-2200	VAR M GLAZE 2K OHM B PH		
RV215	48-31-1500	VAR M GLAZE 500 OHM B PH		
S	81-06-0090	PUSH SWITCH VERT. MODE	ALPS	SUE60
U201	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U202	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U203	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U204	30-90-0140	TRANSISTOR ARRAYS 5 NPN		
U205	35-60-0000	QUAD 2-INPUT NAND GATES	TOSHIBA	TC4011BP
U206	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.	SN74LS74N
U207	35-70-1561	DUAL 2-TO-4 DECODERS	TEXAS INS.	SN74LS156N
U208	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.	SN74LS02N
U209	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.	SN74LS00N
U210	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.	SN74LS10N
U211	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.	SN74LS00N
A3 ASSEMBLY				
***	87-40-0010	TEST POINT 1.2 X 12L		
***	87-40-0010	TEST POINT 1.2 X 12L		
***	87-40-0010	TEST POINT 1.2 X 12L		
***	87-40-0010	TEST POINT 1.2 X 12L		
C301	52-06-3145	FXD CER 22PF 10% 500V TYPE1		
C302	52-06-3145	FXD CER 22PF 10% 500V TYPE1		
C303	50-67-0020	FXD PLSTC FILM 0.0047UF 10% 100V		
C304	50-67-0020	FXD PLSTC FILM 0.0047UF 10% 100V		
C305	50-67-0030	FXD PLSTC FILM 0.01UF 10% 100V		
C306	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C307	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C308	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C309	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C310	50-67-0030	FXD PLSTC FILM 0.01UF 10% 100V		
C311	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C312	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C313	52-01-2235	FXD CER 120PF 10% 50V TYPE1		
C314	52-01-2235	FXD CER 120PF 10% 50V TYPE1		
C315	54-61-1030	FXD ELECT 3.3UF 160V		
C316	54-01-0311	FXD ELECT 10UF 50V		
C317	54-01-0311	FXD ELECT 10UF 50V		
CR301	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR302	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR303	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR304	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR306	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR307	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR308	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
Q301	30-31-9071	TR SI NPN	HITACHI	2SC1907

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
Q302	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q303	30-10-7810	TR SI PNP	HITACHI	2SA781
Q304	30-10-7810	TR SI PNP	HITACHI	2SA781
Q305	30-40-6681	TR SI NPN	HITACHI	2SD668A-C
Q306	30-40-6681	TR SI NPN	HITACHI	2SD668A-C
Q307	30-20-6481	TR SI PNP	HITACHI	2SB648A
Q308	30-20-6481	TR SI PNP	HITACHI	2SB648A
Q309	30-31-8431	TR SI NPN	NEC	2SC1843-E
Q310	30-31-8431	TR SI NPN	NEC	2SC1843-E
R301	42-72-1330	FXD M FILM 330 OHM 1% 1/4W		
R302	42-72-1330	FXD M FILM 330 OHM 1% 1/4W		
R303	40-27-2102	FXD C FILM 1K OHM 5% 1/4W		
R304	40-27-0562	FXD C FILM 56 OHM 5% 1/4W		
R305	40-27-1272	FXD C FILM 270 OHM 5% 1/4W		
R306	40-27-0562	FXD C FILM 56 OHM 5% 1/4W		
R307	40-27-1272	FXD C FILM 270 OHM 5% 1/4W		
R308	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R309	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R310	40-27-1332	FXD C FILM 330 OHM 5% 1/4W		
R311	44-91-3330	FXD M OXIDE 33K OHM 5% 1W		
R312	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R313	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R314	40-27-1332	FXD C FILM 330 OHM 5% 1/4W		
R315	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R316	44-91-3330	FXD M OXIDE 33K OHM 5% 1W		
R317	40-37-3681	FXD C FILM 68K OHM 5% 1/2W		
R318	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		
R319	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R320	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R322	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		
R323	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		
R324	40-27-3152	FXD C FILM 15K OHM 5% 1/4W		
R325	40-27-3152	FXD C FILM 15K OHM 5% 1/4W		
R326	40-27-1822	FXD C FILM 820 OHM 5% 1/4W		
R327	40-27-1822	FXD C FILM 820 OHM 5% 1/4W		
R329	40-27-1472	FXD C FILM 470 OHM 5% 1/4W		
R330	40-27-1472	FXD C FILM 470 OHM 5% 1/4W		
R331	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		

A4 ASSEMBLY

C401	54-00-0311	FXD ELECT 10UF 50V
C402	52-01-2325	FXD CER 680PF 10% 50V TYPE2
C403	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C404	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C405	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2
C406	52-06-3165	FXD CER 33PF 10% 500V TYPE1
C407	54-00-0311	FXD ELECT 10UF 50V
C408	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2
C409	55-37-2050	FXD TANT ELECT 1UF 35V
C410	52-06-3165	FXD CER 33PF 10% 500V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
C411	52-06-3030	FXD CER 3PF 10% 500V TYPE1		
C412	52-06-2265	FXD CER 220PF 10% 50V TYPE1		
C413	52-06-3165	FXD CER 33PF 10% 500V TYPE1		
C414	50-67-0050	FXD PLSTC FILM 0.047UF 10% 100V		
C415	52-06-3165	FXD CER 33PF 10% 500V TYPE1		
C416	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C417	52-01-3405	FXD CER 330PF 10% 500V TYPE1		
C418	52-01-2305	FXD CER 470PF 10% 50V TYPE2		
C419	54-00-0301	FXD ELECT 1UF 50V		
C420	54-00-0301	FXD ELECT 1UF 50V		
C421	54-00-0301	FXD ELECT 1UF 50V		
C422	54-00-0301	FXD ELECT 1UF 50V		
C423	54-00-0301	FXD ELECT 1UF 50V		
C424	54-00-0301	FXD ELECT 1UF 50V		
C425	54-00-0301	FXD ELECT 1UF 50V		
C426	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C427	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C428	54-00-0301	FXD ELECT 1UF 50V		
C429	52-06-3205	FXD CER 68PF 500V TYPE1		
C430	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C431	50-67-0060	FXD PLSTC FILM 0.1UF 10% 100V		
C432	50-65-0540	FXD M PLSTC FILM 1UF 5% 100V		
C433	50-64-3590	FXD M PLSTC FILM 1000PF .5% 100V		
C434	54-00-0311	FXD ELECT 10UF 50V		
C435	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C436	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C437	54-00-0311	FXD ELECT 10UF 50V		
C438	54-00-0311	FXD ELECT 10UF 50V		
C439	54-00-0301	FXD ELECT 1UF 50V		
C440	54-00-0301	FXD ELECT 1UF 50V		
C441	54-00-0312	FXD ELECT 22UF 50V		
C442	54-00-0312	FXD ELECT 22UF 50V		
C443	54-00-0312	FXD ELECT 22UF 50V		
C444	52-01-2265	FXD CER 220PF 10% 50V TYPE2		
C445	52-06-3165	FXD CER 33PF 10% 500V TYPE1		
C446	52-06-3205	FXD CER 68PF 500V TYPE1		
C447	52-06-3165	FXD CER 33PF 10% 500V TYPE1		
C448	54-00-0311	FXD ELECT 10UF 50V		
C449	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
CR401	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR402	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR403	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR404	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR405	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR406	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR407	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR408	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR409	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR410	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR411	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR412	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR413	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR414	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
CR415	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR416	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR417	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR418	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR419	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR420	32-92-0066	ZENER VZ 6.4 - 6.7V P 0.5W	HITACHI	HZ-7A2L
CR421	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR422	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR423	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR424	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR425	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR426	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR427	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC	RD5.6JB2
Q401	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q402	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q403	31-20-0302	FET	TOSHIBA	2SK117-BL
Q404	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q405	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q406	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q407	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q408	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q409	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q410	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q411	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q412	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q413	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q414	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q415	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q416	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q417	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q418	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q419	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q420	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q421	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q422	31-20-1171	FET	TOSHIBA	2SK117-BL
Q423	31-20-1171	FET	TOSHIBA	2SK117-BL
Q424	30-31-8431	TR SI NPN	NEC	2SC1843-E
Q425	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q426	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q427	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q428	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q429	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q430	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q431	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q432	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q433	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q434	30-10-8441	TR SI PNP	HITACHI	2SA844-D
R401	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		
R402	40-27-3182	FXD C FILM 18K OHM 5% 1/4W		
R403	42-72-2270	FXD M FILM 2.7K OHM 1% 1/4W		
R404	42-72-2680	FXD M FILM 6.8K OHM 1% 1/4W		
R405	40-27-0472	FXD C FILM 47 OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R406	40-27-2262	FXD C FILM 2.2K OHM 5% 1/4W
R407	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R408	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R409	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R410	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R411	40-27-5102	FXD C FILM 1M OHM 5% 1/4W
R412	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R413	40-27-3182	FXD C FILM 18K OHM 5% 1/4W
R414	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R415	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R416	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R417	40-27-0822	FXD C FILM 82 OHM 5% 1/4W
R418	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R419	40-27-2682	FXD C FILM 6.8K OHM 5% 1/4W
R420	40-37-0331	FXD C FILM 33 OHM 5% 1/2W
R421	42-72-1680	FXD M FILM 680 OHM 1% 1/4W
R422	40-27-4681	FXD C FILM 680K OHM 5% 1/4W
R423	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R424	40-27-2262	FXD C FILM 2.2K OHM 5% 1/4W
R425	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R426	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R427	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R428	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R429	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R430	40-27-1332	FXD C FILM 330 OHM 5% 1/4W
R431	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R432	40-27-1182	FXD C FILM 180 OHM 5% 1/4W
R433	40-27-1332	FXD C FILM 330 OHM 5% 1/4W
R434	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R435	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R436	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R437	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R438	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R449	40-27-8472	FXD C FILM 4.7 OHM 5% 1/4W
R450	40-27-1332	FXD C FILM 330 OHM 5% 1/4W
R451	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R452	40-27-3222	FXD C FILM 22K OHM 5% 1/4W
R453	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R454	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R455	40-27-4102	FXD C FILM 100K OHM 5% 1/4W
R456	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R457	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R458	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R459	40-27-3152	FXD C FILM 15K OHM 5% 1/4W
R460	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R461	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R462	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R463	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R464	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R465	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R466	40-27-8472	FXD C FILM 4.7 OHM 5% 1/4W
R467	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R468	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W
R469	42-72-3210	FXD M FILM 21K OHM 1% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R470	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R471	42-72-3390	FXD M FILM 39K OHM 1% 1/4W
R472	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W
R473	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R474	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R475	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R476	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R477	40-27-3182	FXD C FILM 18K OHM 5% 1/4W
R478	40-27-3332	FXD C FILM 33K OHM 5% 1/4W
R479	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R480	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R481	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R482	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R483	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R484	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R485	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R486	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R487	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R488	40-27-0472	FXD C FILM 47 OHM 5% 1/4W
R489	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R490	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R491	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R492	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R493	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R494	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R495	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R496	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R497	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R498	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R499	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R4100	42-24-0231	FXD M GLAZE 5M OHM 1% 0.3lW
R4101	42-24-0221	FXD M GLAZE 2M OHM 1% 0.3lW
R4102	42-74-5100	FXD M FILM 1M OHM 1% 1/2W
R4103	42-74-4500	FXD M FILM 500K OHM 1% 1/2W
R4104	42-72-4200	FXD M FILM 200K OHM 1% 1/4W
R4105	42-72-4100	FXD M FILM 100K OHM 1% 1/4W
R4106	42-72-3500	FXD M FILM 50K OHM 1% 1/4W
R4107	42-72-3200	FXD M FILM 20K OHM 1% 1/4W
R4108	42-72-3100	FXD M FILM 10K OHM 1% 1/4W
R4109	42-72-2500	FXD M FILM 5K OHM 1% 1/4W
R4110	42-72-2200	FXD M FILM 2K OHM 1% 1/4W
R4111	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R4112	40-27-0682	FXD C FILM 68 OHM 5% 1/4W
R4113	40-27-0100	FXD C FILM 10 OHM 5% 1/4W
R4114	40-27-1152	FXD C FILM 150 OHM 5% 1/4W
R4115	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R4116	40-27-2682	FXD C FILM 6.8K OHM 5% 1/4W
R4117	40-27-0562	FXD C FILM 56 OHM 5% 1/4W
R4118	40-27-4102	FXD C FILM 100K OHM 5% 1/4W
R4119	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R4120	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R4121	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R4122	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R4123	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION				
R4124	40-27-2182	FXD C FILM	1.8K	OHM	5%	1/4W
R4125	42-72-1920	FXD M FILM	920	OHM	1%	1/4W
R4126	40-27-1152	FXD C FILM	150	OHM	5%	1/4W
R4127	42-72-2301	FXD M FILM	3K	OHM	1%	1/4W
R4128	42-72-2120	FXD M FILM	1.2K	OHM	1%	1/4W
R4129	42-72-2301	FXD M FILM	3K	OHM	1%	1/4W
R4130	40-27-2272	FXD C FILM	2.7K	OHM	5%	1/4W
R4131	40-27-2562	FXD C FILM	5.6K	OHM	5%	1/4W
R4132	40-27-0682	FXD C FILM	68	OHM	5%	1/4W
R4133	42-72-2330	FXD M FILM	3.3K	OHM	1%	1/4W
R4134	42-72-2680	FXD M FILM	6.8K	OHM	1%	1/4W
R4135	40-27-3332	FXD C FILM	33K	OHM	5%	1/4W
R4136	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
R4137	40-27-3332	FXD C FILM	33K	OHM	5%	1/4W
R4138	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
R4139	40-27-3332	FXD C FILM	33K	OHM	5%	1/4W
R4140	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
R4141	40-27-3332	FXD C FILM	33K	OHM	5%	1/4W
R4142	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
R4143	40-27-2562	FXD C FILM	5.6K	OHM	5%	1/4W
R4144	40-27-2222	FXD C FILM	2.2K	OHM	5%	1/4W
R4145	40-27-2562	FXD C FILM	5.6K	OHM	5%	1/4W
R4146	42-72-1680	FXD M FILM	680	OHM	1%	1/4W
R4147	42-72-3100	FXD M FILM	10K	OHM	1%	1/4W
R4148	40-27-3182	FXD C FILM	18K	OHM	5%	1/4W
R4149	40-27-2822	FXD C FILM	8.2K	OHM	5%	1/4W
R4150	40-27-3272	FXD C FILM	27K	OHM	5%	1/4W
R4151	42-72-2390	FXD M FILM	3.9K	OHM	1%	1/4W
R4152	40-27-0102	FXD C FILM	10	OHM	5%	1/4W
R4153	40-27-0102	FXD C FILM	10	OHM	5%	1/4W
R4155	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
R4156	40-27-0472	FXD C FILM	47	OHM	5%	1/4W
R4157	40-27-3102	FXD C FILM	10K	OHM	5%	1/4W
RV401	48-32-2200	VAR M GLAZE	2K	OHM	B	
RV402	48-32-2500	VAR M GLAZE	5K	OHM	B	
RV403	48-32-2200	VAR M GLAZE	2K	OHM	B	
RV404	48-32-3500	VAR M GLAZE	50K	OHM	B	
RV405	48-32-1200	VAR M GLAZE	200	OHM	B	PV
RV406	48-32-1500	VAR M GLAZE	500	OHM	B	PV
RV407	48-32-2100	VAR M GLAZE	1K	OHM	B	PV
S	81-08-0020	PUSH SWITCH DISP. MODE			ALPS	SUE80
S	82-31-0290	TOGGLE SWITCH CURSOL				
S	82-31-0290	TOGGLE SWITCH CURSOL				
U401	35-70-1231	DUAL RETRIG MONO-MULT			TEXAS	INS.SN74LS123N
U402	35-70-0001	QUAD 2-INPUT POSI-NAND			TEXAS	INS.SN74LS00N
U403	35-70-0021	QUAD 2-INPUT POSI-NOR			TEXAS	INS.SN74LS02N
U404	35-70-0021	QUAD 2-INPUT POSI-NOR			TEXAS	INS.SN74LS02N
U405	35-70-0001	QUAD 2-INPUT POSI-NAND			TEXAS	INS.SN74LS00N
U406	35-70-0021	QUAD 2-INPUT POSI-NOR			TEXAS	INS.SN74LS02N
U407	35-70-0041	HEX INVERTERS			TEXAS	INS.SN74LS04N
U408	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV			TEXAS	INS.SN74LS51N

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U409	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U410	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U411	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U412	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U413	34-00-0215	J-FET INPUT OPE-AMP	T.I TL081CP

A5 ASSEMBLY

C501	52-06-2265	FXD CER 220PF 10% 50V TYPE1	
C502	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
C503	52-06-3185	FXD CER 47PF 10% 500V TYPE1	
C504	52-01-3285	FXD CER 330PF 10% 500V TYPE1	
C505	52-01-3285	FXD CER 330PF 10% 500V TYPE1	
C506	54-01-0311	FXD ELECT 10UF 50V	
C507	54-01-0311	FXD ELECT 10UF 50V	
C508	54-01-0311	FXD ELECT 10UF 50V	
C509	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
CR501	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR502	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR503	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR504	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR506	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR507	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR508	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR509	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR510	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR511	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR512	32-92-0240	ZENER VZ 22.8-25.6V P 0.4W	NEC RD24JB
CR513	32-92-0240	ZENER VZ 22.8-25.6V P 0.4W	NEC RD24JB
Q501	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q502	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q503	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q504	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q505	30-32-3710	TR SI NPN	NEC 2SC2371-L
Q506	30-32-3710	TR SI NPN	NEC 2SC2371-L
Q507	30-32-3710	TR SI NPN	NEC 2SC2371-L
Q508	30-32-3710	TR SI NPN	NEC 2SC2371-L
R501	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	
R502	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R503	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W	
R504	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R505	40-27-1682	FXD C FILM 680 OHM 5% 1/4W	
R506	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W	
R507	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R508	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R509	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	
R510	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R511	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W	
R512	44-91-4100	FXD M OXIDE 100K OHM 5% 1W	

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R513	40-27-1272	FXD C FILM 270 OHM 5% 1/4W
R514	44-91-4100	FXD M OXIDE 100K OHM 5% 1W
R515	44-91-4100	FXD M OXIDE 100K OHM 5% 1W
R516	40-27-1272	FXD C FILM 270 OHM 5% 1/4W
R517	44-91-4100	FXD M OXIDE 100K OHM 5% 1W
R518	40-27-2262	FXD C FILM 2.2K OHM 5% 1/4W
R519	40-27-1682	FXD C FILM 680 OHM 5% 1/4W

A6 ASSEMBLY

***	87-40-0010	TEST POINT 1.2 X 12L
***	87-40-0010	TEST POINT 1.2 X 12L
***	87-40-0010	TEST POINT 1.2 X 12L
***	87-40-0010	TEST POINT 1.2 X 12L
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***	87-40-0010	TEST POINT 1.2 X 12L
***	87-40-0010	TEST POINT 1.2 X 12L
***	87-40-0010	TEST POINT 1.2 X 12L
C601	54-60-1560	FXD ELECT 22UF 160V
C602	54-60-1660	FXD ELECT 100UF 200V
C603	54-00-0231	FXD ELECT 1000UF 35V
C604	54-00-0231	FXD ELECT 1000UF 35V
C605	54-00-0231	FXD ELECT 1000UF 35V
C606	54-00-0231	FXD ELECT 1000UF 35V
C607	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C610	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C612	54-00-0121	FXD ELECT 100UF 25V
C613	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C614	54-00-0121	FXD ELECT 100UF 25V
C615	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C616	54-00-0121	FXD ELECT 100UF 25V
C617	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C618	54-00-0121	FXD ELECT 100UF 25V
C619	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C620	54-61-1030	FXD ELECT 3.3UF 160V
C621	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C622	52-06-3185	FXD CER 47PF 10% 500V TYPE1
C623	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C624	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C625	50-67-0060	FXD PLSTC FILM 0.1UF 10% 100V
C626	52-06-3185	FXD CER 47PF 10% 500V TYPE1
C627	52-06-3165	FXD CER 33PF 10% 500V TYPE1
CR601	32-90-0790	DIODE BRIGE VRM 200V IO 1A SINDENGEN S1RBA20

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
CR602	32-90-0860	DIODE BRIGE VRM 600V IO 1A	SINDENGEN S1RBA60
CR603	32-90-0790	DIODE BRIGE VRM 200V IO 1A	SINDENGEN S1RBA20
CR604	32-90-0790	DIODE BRIGE VRM 200V IO 1A	SINDENGEN S1RBA20
CR605	32-90-0523	DIODE VR 600V IO 1A	TOSHIBA S5277J
CR606	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR607	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR608	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR609	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR610	32-91-1620	ZENER VZ 4.30-4.50V P 0.4W	HITACHI HZ5A-1
CR611	32-91-1620	ZENER VZ 4.30-4.50V P 0.4W	HITACHI HZ5A-1
CR612	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR613	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR614	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR615	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR616	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR617	40-27-0000	JUMPER PARTS	
CR618	32-92-0360	ZENER VZ 35.3-36.8V	HITACHI HZ36L-2
L601	67-10-0890	INDUCTOR 100MH 10%	
L602	67-10-0890	INDUCTOR 100MH 10%	
Q601	30-31-5051	TR SI NPN	NEC 2SC1505-K
Q602	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q603	30-40-6681	TR SI NPN	HITACHI 2SD668A-C
Q604	30-40-8802	TR SI NPN	NEC 2SD880-Y
Q605	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q606	30-20-8341	TR SI PNP	TOSHIBA 2SB834-Y
Q607	30-10-8441	TR SI PNP	HITACHI 2SA844-D
Q608	30-40-8802	TR SI NPN	NEC 2SD880-Y
Q609	30-40-8802	TR SI NPN	NEC 2SD880-Y
Q610	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q611	30-20-8341	TR SI PNP	TOSHIBA 2SB834-Y
Q612	30-10-8441	TR SI PNP	HITACHI 2SA844-D
Q613	30-40-8802	TR SI NPN	NEC 2SD880-Y
Q614	30-32-1201	TR SI NPN	TOSHIBA 2SC2120-Y
Q615	30-11-0151	TR SI PNP	TOSHIBA 2SA1015-Y
Q616	30-31-8151	TR SI NPN	TOSHIBA 2SC1815-Y
Q617	30-11-0151	TR SI PNP	TOSHIBA 2SA1015-Y
R601	44-91-3100	FXD M OXIDE 10K OHM 5% 1W	
R602	40-27-0332	FXD C FILM 33 OHM 5% 1/4W	
R603	40-27-3222	FXD C FILM 22K OHM 5% 1/4W	
R604	40-37-4101	FXD C FILM 100K OHM 5% 1/2W	
R605	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W	
R606	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W	
R607	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R608	42-74-4500	FXD M FILM 500K OHM 1% 1/2W	
R609	42-72-3390	FXD M FILM 39K OHM 1% 1/4W	
R610	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W	
R611	40-27-3332	FXD C FILM 33K OHM 5% 1/4W	
R612	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R613	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
R614	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W	
R615	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W	

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R616	40-37-8262	FXD C FILM 2.2 OHM 5% 1/2W
R617	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R618	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R619	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R620	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R621	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R622	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R623	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R624	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W
R625	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R626	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R627	42-72-3200	FXD M FILM 20K OHM 1% 1/4W
R628	42-72-3200	FXD M FILM 20K OHM 1% 1/4W
R629	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R630	40-37-8262	FXD C FILM 2.2 OHM 5% 1/2W
R631	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R632	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W
R633	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W
R634	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R635	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R636	40-37-8262	FXD C FILM 2.2 OHM 5% 1/2W
R637	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R638	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R639	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R640	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R641	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R642	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R643	40-37-8222	FXD C FILM 2.2 OHM 5% 1/2W
R644	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W
R645	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R646	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W
R647	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W
R648	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R649	42-72-3200	FXD M FILM 20K OHM 1% 1/4W
R650	42-72-3200	FXD M FILM 20K OHM 1% 1/4W
R651	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R652	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W
R653	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R654	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R655	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R656	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R657	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R658	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R659	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R660	40-27-1682	FXD C FILM 680 OHM 5% 1/4W
R662	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R663	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R664	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R665	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R666	40-37-4101	FXD C FILM 100K OHM 5% 1/2W
R667	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R668	40-27-0102	FXD C FILM 10 OHM 5% 1/4W
R669	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R670	40-27-1222	FXD C FILM 220 OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
R671	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	
R672	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W	
R673	40-27-3182	FXD C FILM 18K OHM 5% 1/4W	
R674	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R675	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	
R676	40-27-0000	JUMPER PARTS	
R677	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	
R678	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	
RV601	48-33-2200	VAR M FILM 2K OHM	
RV602	48-33-2200	VAR M FILM 2K OHM	
RV603	48-33-4500	VAR M FILM 500K OHM	
U601	34-00-0215	J-FET INPUT OPE-AMP	T.I TL081CP
U602	34-00-0240	DUAL OPE-AMP	NEC UPC4558C
U603	34-00-0240	DUAL OPE-AMP	NEC UPC4558C

A7 ASSEMBLY

C701	54-00-0301	FXD ELECT 1UF 50V	
C702	54-00-0121	FXD ELECT 100UF 25V	
C703	50-67-0070	FXD PLSTC FILM 0.22UF 10% 100V	
C704	54-00-0121	FXD ELECT 100UF 25V	
C705	50-67-0060	FXD PLSTC FILM 0.1UF 10% 100V	
C706	52-08-5145	FXD CER 22PF 10% 2KV TYPE1	
C708	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C709	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C710	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C711	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C712	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C713	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C714	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C715	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C716	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
C718	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
C719	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
C720	52-01-3345	FXD CER 1000PF 10% 500V TYPE2	
C721	50-67-0050	FXD PLSTC FILM 0.047UF 10% 100V	
C722	52-06-3205	FXD CER 68PF 500V TYPE1	
CR701	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR702	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR703	32-90-1820	DIODE VR 2KV FAST RECOVERY	HITACHI ERB26-20
CR704	32-90-1820	DIODE VR 2KV FAST RECOVERY	HITACHI ERB26-20
CR705	32-90-1820	DIODE VR 2KV FAST RECOVERY	HITACHI ERB26-20
CR706	32-90-1820	DIODE VR 2KV FAST RECOVERY	HITACHI ERB26-20
CR707	32-30-0830	DIODE VR 250V IO 200MA	HITACHI 1SS83
CR708	32-30-0830	DIODE VR 250V IO 200MA	HITACHI 1SS83
CR709	32-30-0830	DIODE VR 250V IO 200MA	HITACHI 1SS83
CR710	32-30-0830	DIODE VR 250V IO 200MA	HITACHI 1SS83
CR711	32-92-0056	ZENER VZ 5.5 - 5.8V P 0.4W	NEC RD5.6JB2
CR712	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
CR713	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
CR714	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA 1S1588
Q701	30-10-8441	TR SI PNP	HITACHI 2SA844-D
Q702	30-31-8431	TR SI NPN	NEC 2SC1843-E
Q703	30-10-8441	TR SI PNP	HITACHI 2SA844-D
Q704	30-30-9451	TR SI NPN	NEC 2SC945-Q
Q705	30-40-8802	TR SI NPN	NEC 2SD880-Y
Q706	30-32-3710	TR SI NPN	NEC 2SC2371-L
Q707	30-32-3710	TR SI NPN	NEC 2SC2371-L
R701	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W	
R702	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W	
R703	42-72-3200	FXD M FILM 20K OHM 1% 1/4W	
R704	40-27-5102	FXD C FILM 1M OHM 5% 1/4W	
R705	40-27-4102	FXD C FILM 100K OHM 5% 1/4W	
R706	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	
R707	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W	
R709	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	
R710	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R711	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
R712	44-91-0010	FXD M OXIDE 1 OHM 5% 1W	
R713	44-27-0030	FXD FUSE RESI. 2.2 OHM 5% 1/4W	
R714	40-37-4471	FXD C FILM 470K OHM 5% 1/2W	
R715	40-37-4471	FXD C FILM 470K OHM 5% 1/2W	
R716	40-37-4471	FXD C FILM 470K OHM 5% 1/2W	
R717	40-27-3222	FXD C FILM 22K OHM 5% 1/4W	
R718	42-74-4330	FXD M FILM 330K OHM 1% 1/2W	
R719	42-74-4330	FXD M FILM 330K OHM 1% 1/2W	
R720	40-37-5221	FXD C FILM 2.2M OHM 5% 1/2W	
R721	42-44-0260	FXD M GLAZE 2.5M OHM 1% 1.6W	
R722	42-44-0260	FXD M GLAZE 2.5M OHM 1% 1.6W	
R723	40-37-1471	FXD C FILM 470 OHM 5% 1/2W	
R724	40-27-3222	FXD C FILM 22K OHM 5% 1/4W	
R725	40-37-6101	FXD C FILM 10M OHM 5% 1/2W	
R726	40-37-6101	FXD C FILM 10M OHM 5% 1/2W	
R727	40-37-5221	FXD C FILM 2.2M OHM 5% 1/2W	
R728	40-27-0682	FXD C FILM 68 OHM 5% 1/4W	
R729	40-27-0562	FXD C FILM 56 OHM 5% 1/4W	
R730	40-37-4151	FXD C FILM 150K OHM 5% 1/2W	
R731	40-27-2272	FXD C FILM 2.7K OHM 5% 1/4W	
R732	40-37-4101	FXD C FILM 100K OHM 5% 1/2W	
R733	40-27-3332	FXD C FILM 33K OHM 5% 1/4W	
R734	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
T701	63-92-0060	DC-DC CONVERTER TRANS	KIKUSUI S-751272
V701	23-70-0000	LAMP NEON	
V702	23-70-0000	LAMP NEON	

A8 ASSEMBLY

C801	52-06-3102	FXD CER 10PF 10% 500V TYPE1	

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
C802	52-06-3102	FXD CER 10PF 10% 500V TYPE1
C803	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C804	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C805	52-06-3165	FXD CER 33PF 10% 500V TYPE1
C806	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C807	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C808	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C809	55-37-2080	FXD TANT ELECT 4.7UF 35V
C810	52-06-2265	FXD CER 220PF 10% 50V TYPE1
C811	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C812	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C813	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C814	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C815	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C816	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C817	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C818	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C819	52-06-2245	FXD CER 150PF 10% 50V TYPE1
C820	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C821	55-37-2050	FXD TANT ELECT 1UF 35V
C822	55-37-2050	FXD TANT ELECT 1UF 35V
C823	55-37-2050	FXD TANT ELECT 1UF 35V
C824	55-37-2100	FXD TANT ELECT 10UF 35V
C825	55-37-2100	FXD TANT ELECT 10UF 35V
C826	55-37-2100	FXD TANT ELECT 10UF 35V
C827	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C828	55-37-2060	FXD TANT ELECT 2.2UF 35V
C829	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C830	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C831	55-37-2100	FXD TANT ELECT 10UF 35V
C832	52-01-2305	FXD CER 470PF 10% 50V TYPE2
C833	55-37-2050	FXD TANT ELECT 1UF 35V
C834	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C835	55-37-2030	FXD TANT ELECT 0.47MF 35V
C836	52-06-3185	FXD CER 47PF 10% 500V TYPE1
C837	55-37-2100	FXD TANT ELECT 10UF 35V
C838	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C839	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C840	52-01-2305	FXD CER 470PF 10% 50V TYPE2
C841	55-37-2100	FXD TANT ELECT 10UF 35V
C842	52-06-3145	FXD CER 22PF 10% 500V TYPE1
C843	54-00-0311	FXD ELECT 100UF 50V
C844	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C845	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C846	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C847	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C848	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C849	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C850	55-37-2050	FXD TANT ELECT 1UF 35V
C851	55-37-2050	FXD TANT ELECT 1UF 35V
C852	55-37-2050	FXD TANT ELECT 1UF 35V
C853	55-37-2050	FXD TANT ELECT 1UF 35V
C854	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C855	52-06-2225	FXD CER 100PF 10% 50V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
C856	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C857	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C858	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C859	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C860	54-00-0121	FXD ELECT 100UF 25V
C861	54-00-0121	FXD ELECT 100UF 25V
C862	52-06-3125	FXD CER 15PF 10% 500V TYPE1
C863	55-37-2060	FXD TANT ELECT 2.2UF 35V
C864	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C865	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C866	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C867	55-37-2050	FXD TANT ELECT 1UF 35V
C868	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C869	55-37-2050	FXD TANT ELECT 1UF 35V
C870	55-37-2050	FXD TANT ELECT 1UF 35V
C871	55-37-2050	FXD TANT ELECT 1UF 35V
C872	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C873	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C874	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C875	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C876	52-01-2225	FXD CER 100PF 10% 50V TYPE2
C877	52-01-2225	FXD CER 100PF 10% 50V TYPE2
C878	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C879	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C880	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C881	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C882	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C883	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C884	55-37-2050	FXD TANT ELECT 1UF 35V
C885	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C886	55-37-2050	FXD TANT ELECT 1UF 35V
C887	55-37-2050	FXD TANT ELECT 1UF 35V
C888	55-37-2050	FXD TANT ELECT 1UF 35V
C889	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C890	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C891	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C892	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C893	52-01-2225	FXD CER 100PF 10% 50V TYPE2
C894	52-01-2225	FXD CER 100PF 10% 50V TYPE2
C895	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C896	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C897	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C898	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C899	55-37-2100	FXD TANT ELECT 10UF 35V
C8100	55-37-2100	FXD TANT ELECT 10UF 35V
C8101	54-00-0121	FXD ELECT 100UF 25V
C8102	52-06-2245	FXD CER 150PF 10% 50V TYPE1
C8103	52-01-2225	FXD CER 100PF 10% 50V TYPE2
C8104	52-01-2425	FXD CER 4700PF 10% 50V TYPE2
C8105	52-01-2385	FXD CER 2200PF 10% 50V TYPE2
C8106	52-01-2385	FXD CER 2200PF 10% 50V TYPE2
C8107	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C8108	52-01-2345	FXD CER 1000PF 10% 50V TYPE2
C8109	52-01-2225	FXD CER 100PF 10% 50V TYPE2

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
C8110	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
CR801	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR802	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR803	32-90-0780	ZENER VZ 1.8 - 2.5V P 0.25W	TOSHIBA	02BZ2.2
CR804	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR805	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR806	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
CR807	32-90-0770	ZENER VZ 2.8-3.8V P 250MW	TOSHIBA	02BZ3.3
CR808	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR809	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
CR810	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR811	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
CR812	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR813	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR814	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR815	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR816	32-91-1340	ZENER VZ 6.00-7.00V P 0.25W	TOSHIBA	1SZ59
CR817	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR818	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR819	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR820	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR821	32-90-0523	DIODE VR 600V IO 1A	TOSHIBA	S5277J
CV801	57-10-1223	VAR CER 8-50PF		
CV802	57-10-1223	VAR CER 8-50PF		
C809*	55-37-2030	FXD TANT ELECT 0.47MF 35V		
Q801	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q802	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q803	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q804	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q805	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q806	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
R801	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		
R802	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
R803	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		
R804	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W		
R805	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
R806	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		
R807	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R808	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R809	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W		
R810	40-27-1222	FXD C FILM 220 OHM 5% 1/4W		
R811	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R812	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R813	40-27-3272	FXD C FILM 27K OHM 5% 1/4W		
R814	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R815	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R816	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R817	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W		
R818	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION
R819	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R820	42-72-2560	FXD M FILM 5.6K OHM 1% 1/4W
R821	42-72-1390	FXD M FILM 390 OHM 1% 1/4W
R822	42-72-0270	FXD M FILM 27 OHM 1% 1/4W
R823	44-92-0680	FXD M OXIDE 68 OHM 5% 1W
R824	40-27-3823	FXD C FILM 82K OHM 5% 1/4W
R825	40-27-1227	FXD C FILM 220 OHM 5% 1/4W
R826	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R827	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R828	40-27-3227	FXD C FILM 22K OHM 5% 1/4W
R829	42-72-3110	FXD M FILM 11K OHM 1% 1/4W
R830	40-27-1472	FXD C FILM 470 OHM 5% 1/4W
R831	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R832	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R833	40-27-3102	FXD C FILM 10K OHM 5% 1/4W
R834	40-27-4222	FXD C FILM 220K OHM 5% 1/4W
R835	40-27-3392	FXD C FILM 39K OHM 5% 1/4W
R836	40-27-4102	FXD C FILM 100K OHM 5% 1/4W
R837	40-27-4222	FXD C FILM 220K OHM 5% 1/4W
R838	40-27-1332	FXD C FILM 330 OHM 5% 1/4W
R839	40-27-3227	FXD C FILM 22K OHM 5% 1/4W
R840	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R841	42-72-2330	FXD M FILM 3.3K OHM 1% 1/4W
R842	42-72-2180	FXD M FILM 1.8K OHM 1% 1/4W
R843	40-27-1562	FXD C FILM 560 OHM 5% 1/4W
R844	42-72-2270	FXD M FILM 2.7K OHM 1% 1/4W
R845	42-72-1560	FXD M FILM 560 OHM 1% 1/4W
R846	42-72-1560	FXD M FILM 560 OHM 1% 1/4W
R847	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R848	42-72-2220	FXD M FILM 2.2K OHM 1% 1/4W
R849	42-72-2390	FXD M FILM 3.9K OHM 1% 1/4W
R850	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R851	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R852	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W
R853	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W
R854	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R855	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R856	42-72-2330	FXD M FILM 3.3K OHM 1% 1/4W
R857	42-72-2180	FXD M FILM 1.8K OHM 1% 1/4W
R858	40-27-1822	FXD C FILM 820 OHM 5% 1/4W
R859	42-72-1180	FXD M FILM 180 OHM 1% 1/4W
R860	42-72-1180	FXD M FILM 180 OHM 1% 1/4W
R861	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R862	40-27-1222	FXD C FILM 220 OHM 5% 1/4W
R863	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R864	42-72-2100	FXD M FILM 1K OHM 1% 1/4W
R865	42-72-3120	FXD M FILM 12K OHM 1% 1/4W
R866	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R867	40-27-2102	FXD C FILM 1K OHM 5% 1/4W
R868	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R869	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R870	40-27-0222	FXD C FILM 22 OHM 5% 1/4W
R871	40-27-1102	FXD C FILM 100 OHM 5% 1/4W
R872	40-27-2102	FXD C FILM 1K OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
R873	42-72-2100	FXD M FILM 1K OHM 1% 1/4W	
R874	42-72-2330	FXD M FILM 3.3K OHM 1% 1/4W	
R875	42-72-2180	FXD M FILM 1.8K OHM 1% 1/4W	
R876	40-27-1822	FXD C FILM 820 OHM 5% 1/4W	
R877	42-72-1180	FXD M FILM 180 OHM 1% 1/4W	
R878	42-72-1180	FXD M FILM 180 OHM 1% 1/4W	
R879	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R880	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R881	42-72-2100	FXD M FILM 1K OHM 1% 1/4W	
R882	42-72-2100	FXD M FILM 1K OHM 1% 1/4W	
R883	42-72-3120	FXD M FILM 12K OHM 1% 1/4W	
R884	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R885	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R886	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	
R887	40-27-0220	FXD C FILM 22 OHM 5% 1/4W	
R888	40-27-0220	FXD C FILM 22 OHM 5% 1/4W	
R889	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	
R890	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R891	40-27-1332	FXD C FILM 330 OHM 5% 1/4W	
R892	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R893	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
RA801	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA802	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA803	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA804	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA805	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA806	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA807	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA808	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA809	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA810	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA811	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA812	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RV801	48-33-3500	VAR M FILM 50K OHM	
RV802	48-33-1200	VAR M FILM 200 OHM	
RV803	48-33-2100	VAR M FILM 1K OHM	
RV804	48-33-2100	VAR M FILM 1K OHM	
RV805	48-33-2200	VAR M FILM 2K OHM	
RV806	48-33-2100	VAR M FILM 1K OHM	
RV807	48-33-3200	VAR M FILM 20K OHM	
RV808	48-33-3200	VAR M FILM 20K OHM	
RV809	48-33-2200	VAR M FILM 2K OHM	
RV810	48-33-2100	VAR M FILM 1K OHM	
RV811	48-33-3200	VAR M FILM 20K OHM	
RV812	48-33-3200	VAR M FILM 20K OHM	
RV813	48-33-2200	VAR M FILM 2K OHM	
U8A1	34-90-0010	TIMER IC	N.S LM555CN
U8A6	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.SN74LS10N
U8A7	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8A8	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8A9	35-70-0051	HEX INVERTERS	HITACHI HD74LS05P

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U8A10	34-00-0111	FET OPE-AMP	N.S LF356N
U8A11	34-00-0111	FET OPE-AMP	N.S LF356N
U8B1	35-70-1481	OCTAL PRIORITY ENCODERS	HITACHI HD74LS148P
U8B2	35-70-0000	QUAD 2-INPUT POSI-NAND	HITACHI HD7400P
U8B3	35-70-1511	1-OF-8 DATA SELEC./MULTIP.	T.I SN74LS151N
U8B4	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8B5	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8B6	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8B7	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8B8	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8B9	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8C1	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8C2	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U8C3	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U8C4	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8C5	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8C6	35-70-0081	QUAD 2-INPUT POSI-AND	T.I SN74LS08N
U8C7	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8C8	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8C9	35-70-1741	HEX D-TYPE FLIP FLOP	T.I SN74LS174N
U8C10	36-20-0070	D/A CONVERTER 10BIT	PMI DAC-10GX
U8D1	35-70-0031	QUAD 2-INPUT POSI-NAND	T.I SN74LS03N
U8D2	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U8D3	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U8D4	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N
U8D5	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N
U8D6	35-70-0271	TRI 3-INPUT POSI-NAND	T.I SN74LS27N
U8D7	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8D8	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.SN74LS10N
U8D9	35-70-0250	DUAL 4-INPUT POSI-NOR	T.ISN7425N
U8D10	35-70-1741	HEX D-TYPE FLIP FLOP	T.I SN74LS174N
U8E1	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8E2	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8E3	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U8E4	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N
U8E5	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8E6	35-70-0250	DUAL 4-INPUT POSI-NOR	T.ISN7425N
U8E7	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8E8	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8E9	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8E10	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8E11	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8F1	35-70-0081	QUAD 2-INPUT POSI-AND	T.I SN74LS08N
U8F2	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.SN74LS10N
U8F3	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8F4	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8F6	35-70-0271	TRI 3-INPUT POSI-NAND	T.I SN74LS27N
U8F7	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8F8	35-70-2831	4 BIT BINARY FULL ADDER	T.I SN74LS283N
U8F9	35-70-2831	4 BIT BINARY FULL ADDER	T.I SN74LS283N
U8F10	35-70-2831	4 BIT BINARY FULL ADDER	T.I SN74LS283N
U8F11	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8G1	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8G2	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U8G3	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8G4	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8G5	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U8G6	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U8G7	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8G8	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8G9	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8G10	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U8G11	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8H1	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8H2	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8H3	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8H4	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8H5	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8H6	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8H7	35-70-0201	DUAL 4-INPUT POSI-NAND	T.I SN74LS20N
U8H8	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8H9	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8H10	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8H11	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8J1	35-70-2441	TRI-STATE OCTAL BUFFER	HITACHI HD74LS244P
U8J2	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U8J3	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8J4	35-70-1571	QUAD 2-TO-1 DATA SELECTORS	T.I SN74LS157N
U8J5	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8J6	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8J7	35-70-0211	DUAL 4-INPUT POSI-AND	T.I SN74LS21N
U8J8	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8J9	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8J10	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U8J11	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8K1	35-70-0271	TRI 3-INPUT POSI-NAND	T.I SN74LS27N
U8K2	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8K4	34-00-0111	FET OPE-AMP	N.S LF356N
U8K5	36-20-0060	D/A CONVERTER 8 BIT	PMI DAC-08EQ
U8K6	35-70-2731	OCTAL D-TYPE FLIP FLOP	T.I SN74LS273N
U8K7	35-56-0040	RAM STATIC 1KW*4 BIT	HITACHI HM472114P
U8K8	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	T.I SN74LS153N
U8K9	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	T.I SN74LS153N
U8K10	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	T.I SN74LS153N
U8K11	35-70-2431	QUAD 3-STATE BUS TRANCEIVER	T.I SN74LS243N
U8L1	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U8L2	34-00-0111	FET OPE-AMP	N.S LF356N
U8L4	34-00-0111	FET OPE-AMP	N.S LF356N
U8L5	36-20-0060	D/A CONVERTER 8 BIT	PMI DAC-08EQ
U8L6	35-70-2731	OCTAL D-TYPE FLIP FLOP	T.I SN74LS273N
U8L7	35-56-0040	RAM STATIC 1KW*4 BIT	HITACHI HM472114P
U8L8	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	T.I SN74LS153N
U8L9	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	T.I SN74LS153N
U8L10	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.SN74LS10N
U8L11	35-70-2431	QUAD 3-STATE BUS TRANCEIVER	T.I SN74LS243N
U8M1	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U8M2	34-00-0111	FET OPE-AMP	N.S LF356N
U8M3	34-00-0111	FET OPE-AMP	N.S LF356N

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U8M4	34-00-0111	FET OPE-AMP	N.S LF356N
U8M6	35-70-2731	OCTAL D-TYPE FLIP FLOP	T.I SN74LS273N
U8M7	35-70-2441	TRI-STATE OCTAL BUFFER	HITACHI HD74LS244P
U8M8	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8M9	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8M10	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8M11	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U8N1	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U8N4	34-40-0180	REGULATOR -5V 1.5A	MOTOROLA MC7905CT
U8N6	36-30-0060	A/D CONVERTER 8 BIT	TRW TDC1001J
U8N7	35-70-0002	QUAD 2-INPUT POSI-NAND	T.I SN74S00N
U8N8	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U8N9	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U8N10	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U8N11	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
XTL801	93-00-0080	QUARTS CRISTAL 10MHZ	HC18/U
A9 ASSEMBLY			
RV901	46-16-2202	VAR M GLAZE 2K OHM B	
RV902	46-16-5202	VAR M GLAZE 2M OHM B	
RV903	46-16-2102	VAR M GLAZE 1K OHM B	
RV904	46-16-2202	VAR M GLAZE 2K OHM B	
S	81-01-0270	PUSH SWITCH	ALPS SDG5P-E
CS ASSEMBLY			
U	34-40-0240	REGULATOR 5V 3A	N.S LM323K
RP ASSEMBLY			
B	76-57-0090	FAN MOTOR	
F	99-02-0140	FUSE 3A-250V 6.35X31.8	
R2206	40-27-0562	FXD C FILM 56 OHM 5% 1/4W	
T	60-48-0050	POWER TRANS FOR DSS 6520/21	KIKUSUI S8211392

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
SP ASSEMBLY			
S	81-01-0570	POWER SWITCH	ALPS SDGA3P
A1B ASSEMBLY			
C1109	52-06-3051	FXD CER 5PF 10% 500V TYPE1	
C1109	52-06-3051	FXD CER 5PF 10% 500V TYPE1	
C1110	52-06-2225	FXD CER 100PF 10% 50V TYPE1	
C1110	52-06-2225	FXD CER 100PF 10% 50V TYPE1	
CV101	57-10-1180	VAR CER 1.5-4PF	
CV101	57-10-1180	VAR CER 1.5-4PF	
CV102	57-10-1190	VAR CER 3-10PF	
CV102	57-10-1190	VAR CER 3-10PF	
CV103	57-10-1180	VAR CER 1.5-4PF	
CV103	57-10-1180	VAR CER 1.5-4PF	
CV104	57-10-1200	VAR CER 3.3-18PF	
CV104	57-10-1200	VAR CER 3.3-18PF	
CV105	57-10-1180	VAR CER 1.5-4PF	
CV105	57-10-1180	VAR CER 1.5-4PF	
CV106	57-10-1190	VAR CER 3-10PF	
CV106	57-10-1190	VAR CER 3-10PF	
R101	40-27-0332	FXD C FILM 33	OHM 5% 1/4W
R101	40-27-0332	FXD C FILM 33	OHM 5% 1/4W
R102	40-27-0562	FXD C FILM 56	OHM 5% 1/4W
R102	40-27-0562	FXD C FILM 56	OHM 5% 1/4W
R1113	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W
R1113	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W
R1114	40-27-0152	FXD C FILM 15	OHM 5% 1/4W

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
R1114	40-27-6152	FXD C FILM 15 OHM 5% 1/4W	
RV102	45-01-0650	VAR C COMP 2K/2K OHM	
RV104	45-01-0650	VAR C COMP 2K/2K OHM	

A13 ASSEMBLY

C1301	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2	
C1302	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2	
C1303	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2	
C1304	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2	
C1305	52-01-2345	FXD CER 1000PF 10% 50V TYPE2	
C1306	55-37-2050	FXD TANT ELECT 1UF 35V	
C1307	52-01-2345	FXD CER 1000PF 10% 50V TYPE2	
C1308	55-37-2050	FXD TANT ELECT 1UF 35V	
C1313	54-00-0121	FXD ELECT 100UF 25V	
R1302	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1303	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
R1304	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1305	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
R1306	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1308	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1309	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R1310	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R1311	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R1312	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R1313	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
R1314	40-27-1562	FXD C FILM 560 OHM 5% 1/4W	
U13A3	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N
U13A4	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U13B1	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13B2	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13B3	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13B4	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N
U13C1	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13C2	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13C3	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13C4	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U13D1	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13D2	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13D3	35-70-0851	4BIT MAGNITUDE COMPARATORS	T.I SN74LS85N
U13D4	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U13E1	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13E2	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13E3	35-70-1911	4 BIT UP/DOWN BIN. COUNTER	HITACHI HD74LS191P
U13E4	35-70-0101	TRI 3-INPUT POSI-NAND	TEXAS INS.SN74LS10N

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U13F1	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U13F2	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U13F3	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U13F4	35-70-3901	DUAL DECADE COUNTERS	T.I SN74LS390N
U13G1	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U13G2	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U13G3	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U13G4	35-70-1901	4 BIT UP/DOWN DEC. COUNTER	T.I SN74LS190N

A14 ASSEMBLY

C1401	54-00-0121	FXD ELECT 100UF 25V	
C1402	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1403	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1404	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1405	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1406	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1407	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1408	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1409	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1410	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1411	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1412	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1413	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1414	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1415	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1416	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1417	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1418	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1419	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1420	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1421	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1422	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1423	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1424	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1425	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1426	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1427	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1428	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1429	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1430	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1431	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1432	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1433	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1434	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1435	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1436	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1437	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1438	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1439	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1440	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1
C1441	52-37-1003	FXD CER 0.047UF 20% 25V	TYPE1

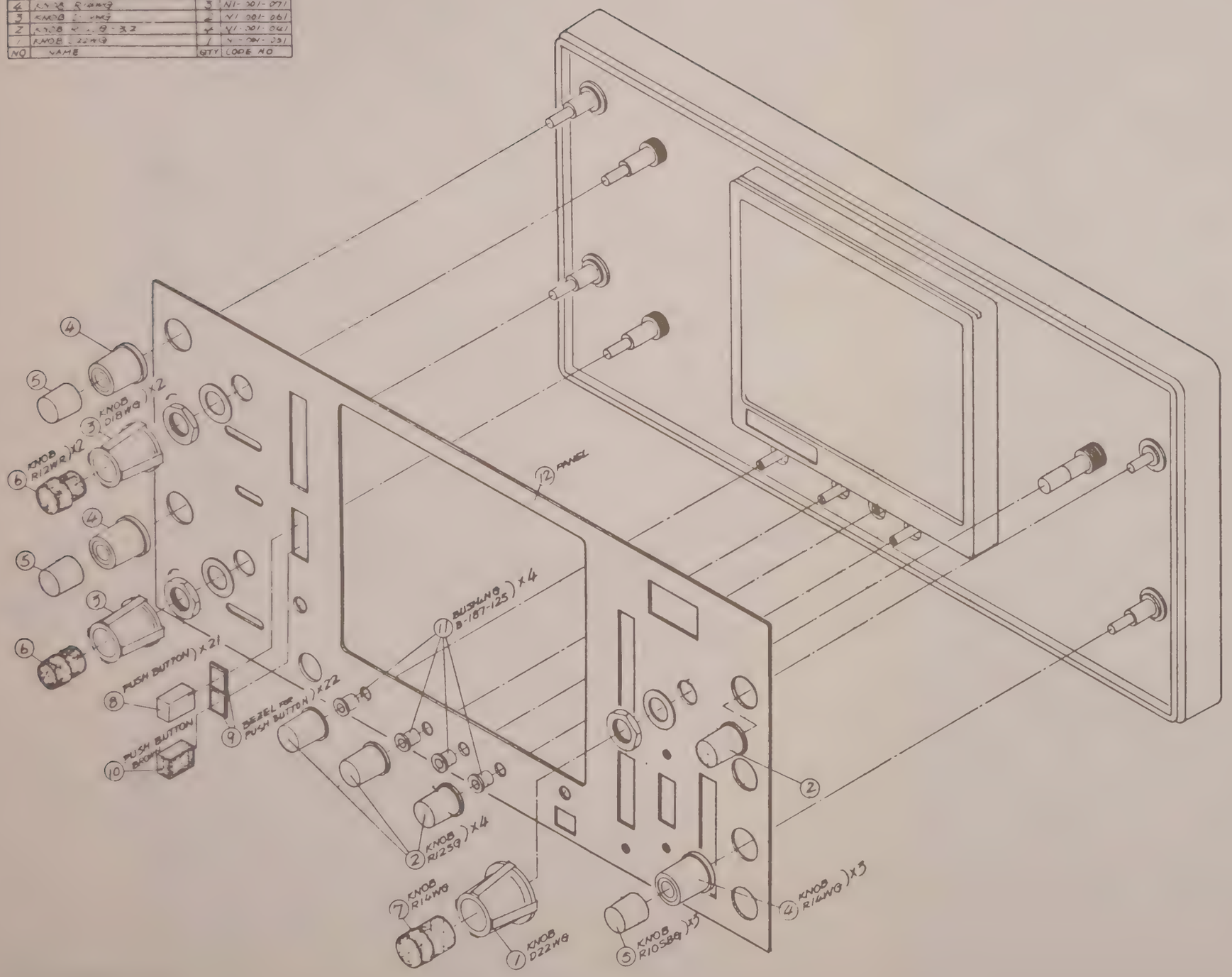
REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
C1442	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1443	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1444	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1445	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1446	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1447	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1448	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1449	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1450	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1451	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1452	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1453	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1454	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1455	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1456	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1457	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1458	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1459	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1460	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C1461	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
C1462	54-00-0311	FXD ELECT 10UF 50V		
C1463	52-01-2285	FXD CER 330PF 10% 50V TYPE2		
C1464	52-01-2305	FXD CER 470PF 10% 50V TYPE2		
C1465	52-06-3165	FXD CER 33PF 10% 500V TYPE1		
C1466	52-01-2305	FXD CER 470PF 10% 50V TYPE2		
C1467	54-00-0312	FXD ELECT 22UF 50V		
C1468	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C1469	52-01-2225	FXD CER 100PF 10% 50V TYPE2		
C1470	52-01-2225	FXD CER 100PF 10% 50V TYPE2		
C1471	52-06-3145	FXD CER 22PF 10% 500V TYPE1		
C1472	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C1473	52-01-2345	FXD CER 1000PF 10% 50V TYPE2		
CR1401	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR1402	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
CR1403	32-11-5880	DIODE VR 30V IO 120MA	TOSHIBA	1S1588
Q1401	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1402	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1403	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1404	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1405	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1406	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1407	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1408	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1409	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
Q1410	30-31-8151	TR SI NPN	TOSHIBA	2SC1815-Y
R1401	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R1402	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R1403	40-27-1332	FXD C FILM 330 OHM 5% 1/4W		
R1404	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R1405	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R1406	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
R1407	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1408	40-27-4102	FXD C FILM 100K OHM 5% 1/4W	
R1409	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	
R1410	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1411	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1412	40-27-3392	FXD C FILM 39K OHM 5% 1/4W	
R1413	42-72-3752	FXD M FILM 75K OHM 1% 1/4W	
R1414	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1415	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1416	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1417	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1418	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1419	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1420	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1421	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1422	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1423	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1424	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R1425	40-27-1392	FXD C FILM 3900 OHM 5% 1/4W	
R1426	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1427	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1428	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1429	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1430	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1431	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
R1432	40-27-1222	FXD C FILM 2200 OHM 5% 1/4W	
RA1401	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1402	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1403	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1404	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1405	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1406	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
RA1407	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA1408	44-07-0020	FXD M GLAZE RESISTOR NETWORKS 10K OHM X4	
RA1409	44-08-0010	FXD M GLAZE RESISTOR NETWORKS 10K OHM X8	
U14A1	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14A3	36-90-0100	Z80-PIO	SHARP LH0081
U14A8	35-70-0271	TRI 3-INPUT POSI-NAND	T.I SN74LS27N
U14A9	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U14A10	35-70-1381	3LINE TO 8LINE DECODER	HITACHI HD74LS138P
U14A11	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14B1	35-70-1481	OCTAL PRIORITY ENCODERS	HITACHI HD74LS148P
U14B2	35-70-0111	TRI 3-INPUT POSI-AND	HITACHI HD74LS11P
U14B6	36-90-0090	Z80-CPU	SHARP LH0080
U14B6	84-29-0100	IC SOCKET 40P	
U14B8	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U14B9	35-70-0250	DUAL 4-INPUT POSI-NOR	T.ISN7425N
U14B10	35-70-0030	QUAD 2-INPUT POSI-NAND	T.I SN7403N
U14C1	35-70-1481	OCTAL PRIORITY ENCODERS	HITACHI HD74LS148P
U14C2	35-70-0201	DUAL 4-INPUT POSI-NAND	T.I SN74LS20N
U14C3	36-90-0100	Z80-PIO	SHARP LH0081
U14C6	35-59-0010	EPROM 2048 X 8	HITACHI HN462716G

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	
U14C6	84-29-0080	IC SOCKET 24P	
U14C7	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14C8	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U14C9	35-70-1641	8BIT PARALOAD SHIFTREGISTER	HITACHI HD74LS164P
U14C10	35-70-1511	1-OF-8 DATA SELEC./MULTIP.	T.I SN74LS151N
U14C11	35-70-0030	QUAD 2-INPUT POSI-NAND	T.I SN7403N
U14D1	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14D2	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U14D3	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14D4	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14D6	35-56-0090	CMOS RAM 2048*8BIT	HITACHI HM6116P-4
U14D7	35-70-1391	2-TO-4 DECORDER	HITACHI HD74LS139P
U14D8	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14D9	35-70-1661	8BIT SIFTREGISTER	HITACHI HD74LS166P
U14D10	35-70-1751	QUAD D F/F	HITACHI HD74LS175P
U14D11	35-70-1231	DUAL RETRIG MONO-MULT	TEXAS INS.SN74LS123N
U14E1	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14E2	35-70-0511	DUAL 2-W 2-INPUT AND-OR-INV	TEXAS INS.SN74LS51N
U14E3	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14E4	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14E7	35-70-0321	QUAD 2INPUT POSI-OR	T.I SN74LS32N
U14E8	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U14E9	35-70-1661	8BIT SIFTREGISTER	HITACHI HD74LS166P
U14E10	35-70-0081	QUAD 2-INPUT POSI-AND	T.I SN74LS08N
U14E11	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14F1	35-70-3741	OCTAL D F/F 3STATE OUTPUT	T.I SN74LS374
U14F2	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14F3	35-70-1571	QUAD 2-TO-1 DATA SELECTORS	T.I SN74LS157N
U14F4	35-70-1571	QUAD 2-TO-1 DATA SELECTORS	T.I SN74LS157N
U14F5	35-70-0001	QUAD 2-INPUT POSI-NAND	TEXAS INS.SN74LS00N
U14F6	35-70-0081	QUAD 2-INPUT POSI-AND	T.I SN74LS08N
U14F7	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14F8	35-70-0321	QUAD 2INPUT POSI-OR	T.I SN74LS32N
U14F9	35-70-1661	8BIT SIFTREGISTER	HITACHI HD74LS166P
U14F10	35-70-0081	QUAD 2-INPUT POSI-AND	T.I SN74LS08N
U14F11	35-70-0471	BCD-TO-SEVEN-SEG DECO/DRI	T.I SN74LS47N
U14G1	35-70-0041	HEX INVERTERS	TEXAS INS.SN74LS04N
U14G6	35-70-0021	QUAD 2-INPUT POSI-NOR	TEXAS INS.SN74LS02N
U14G7	35-70-0741	DUAL D-FLIP FLOP	TEXAS INS.SN74LS74N
U14G8	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI HD74LS193P
U14G9	35-70-1661	8BIT SIFTREGISTER	HITACHI HD74LS166P
U14G10	35-70-0321	QUAD 2INPUT POSI-OR	T.I SN74LS32N
U14G11	35-19-2070	7-SEG DISPLAY DRIVER	TEXAS.INS.SN7515U3N
XTL1401	93-00-0140	QUARTS CRISTAL 4.9152MHZ	HC-18/U

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION		
CRT ASSEMBLY				
L	66-21-0081	ROTATION COIL		
V	21-16-0601	CATHODE RAY TUBE	TOSHIBA	150BTB31
R	40-27-1472	FXD C FILM 470 OHM 5% 1/4W		
R	40-27-1822	FXD C FILM 820 OHM 5% 1/4W		
R	40-27-1822	FXD C FILM 820 OHM 5% 1/4W		
R	40-27-1822	FXD C FILM 820 OHM 5% 1/4W		
RV408	45-01-0670	VAR C COMP 100K/1M OHM B		
RV410	45-01-0570	VAR C COMP 20K OHM B		
S	80-23-4000	ROTARY SWITCH TIME/DIV		
S	81-02-0170	PUSH SWITCH MEM PROTECT	ALPS	SUE20
S	81-05-0210	PUSH SWITCH TRIGGER	ALPS	SUE50

NO	NAME	QTY	CODE NO
20			
19			
18			
17			
16			
15			
14			
13			
12	LABEL	1	A1-670 01
11	BUSHING B-187-125	4	H6-000 101
10	PUSH BUTTON 7.5x5.5 320MM	1	P2 100-571
9	BEZEL FOR PUSH BUTTON	22	P2 000-231
8	PUSH BUTTON 7.5x5.5	21	P2 100 321
7	KNOB R14WR RED	1	N2-000 061
6	KNOB R12NR-25 RED	2	N2-100-251
5	KNOB R10SBG-32 BLUE	3	N1 101 01
4	KNOB R14WG	3	N1-101-071
3	KNOB D18WG	4	N1 101-061
2	KNOB R12SG	4	N1-101-041
1	KNOB D22WG	1	N-100-031



FRONT PANEL ASSEMBLY (1)

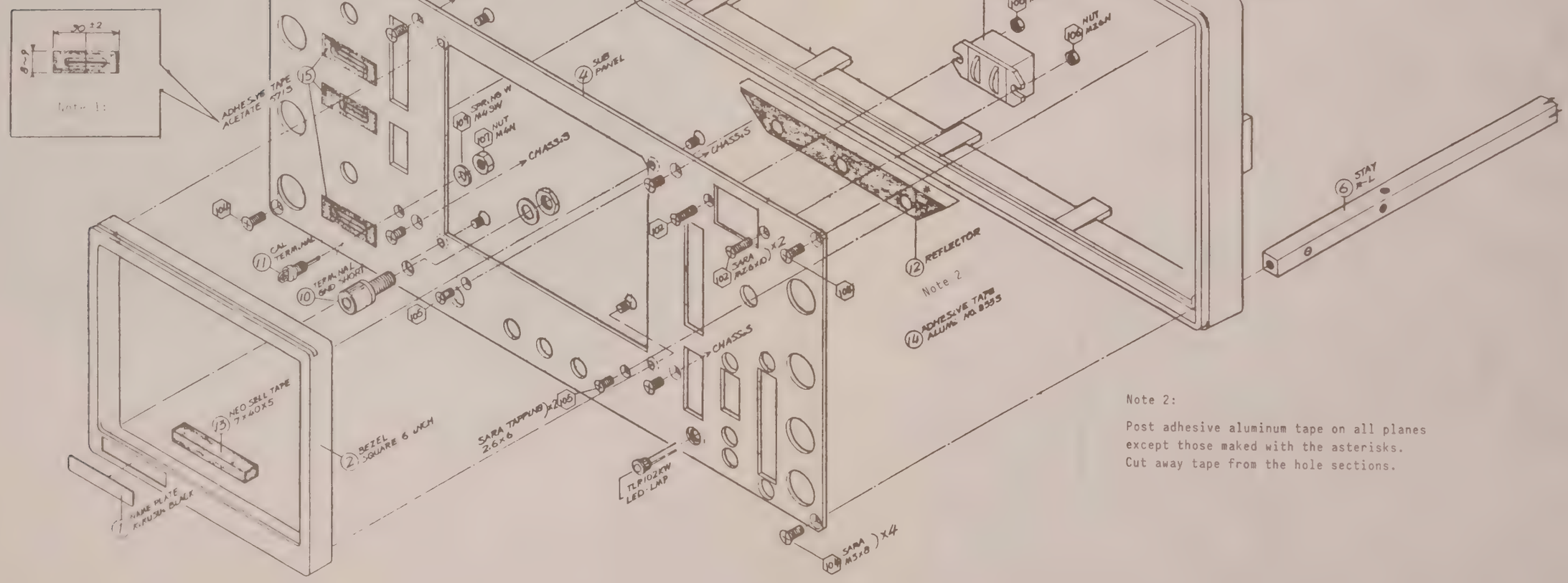
NO	NAME	QTY	CODE NO.
20			
19			
18			
17			
16			
15	ADHESIVE TAPE 'ACETATE' 57/5		T6-200-131
14	ADHESIVE TAPE 'ALUM.' #8355		T4-200-121
13	NEO SELL TAPE 7×40×5	1	R3-250-041
12	REFLECTOR	1	QM-470-001
11	CAL TERMINAL	1	F2-200-291
10	TERMINAL GND SHORT	1	L4-000-321
9	STAY S	1	78-470-005
8	STAY L-U	1	98-470-004
7	STAY R-U	1	98-470-003
6	STAY R-L	1	98-470-002
5	STAY L	1	98-470-001
4	SUB PANEL FRONT	1	C1-470-001
3	FRAME 310×150 GOLD	1	B9-506-001
2	BEZEL SQUARE 6 INCH	1	B9-050-141
1	NAME PLATE (LATE KIKUSUI BLACK)	1	98-300-621
NO	NAME	QTY	CODE NO.

Note 1:

Post a strip of adhesive acetate tape to mask each of the slites of the subpanel, and cut a line in the strip in the center of the slit in its longitudinal direction using a cutter knife from the back of the sbpanel.

NO	NAME	QTY	CODE NO.
109	SPRING W M4&SW	1	M5-011-081
108			
107	NUT M4&N	1	M4-011-241
106	NUT M2.6N	2	M2.6-011-221
105	SARA TAPPING 2.6×6	4	M2-001-401
104	SARA M3×8	5	M2-001-271
103	SARA M3×6	8	M2-001-281
102	SARA M2.6×10	2	M2-001-261
101			
NO	NAME	QTY	CODE NO.

The screws are SARA M3x6 (counter-sunk screws).



Note 2:

Post adhesive aluminum tape on all planes except those maked with the asterisks. Cut away tape from the hole sections.

NO	NAME	QTY	CODE NO
19			
18			
17			
16	SPACER HEX 3-5-4	3	L3-470-004
15	DUST FILTER	1	R4-470-103
14	PLATE VOLTAGE SELECT	1	U2-000-191
13	HOLDER CORD 3W	4	P2-000-101
12			
11	STAY L-U	1	G8-470-004
10	STAY R-U	1	G8-470-003
9	STAY R-L	1	G4-470-002
8	STAY L	1	G4-470-001
7	NET	1	D9-470-101
6	BRACKET FOR PCB-1	2	D3-470-102
5	BRACKET FOR PT-L	1	D3-470-005
4	BRACKET FOR PT-U	1	D3-470-104
3	PLATE REAR	1	G6-470-101
2	COVER FOR FAN	1	G1-470-001
1	BLANK PLATE	1	A8-470-101
NO	NAME	QTY	CODE NO

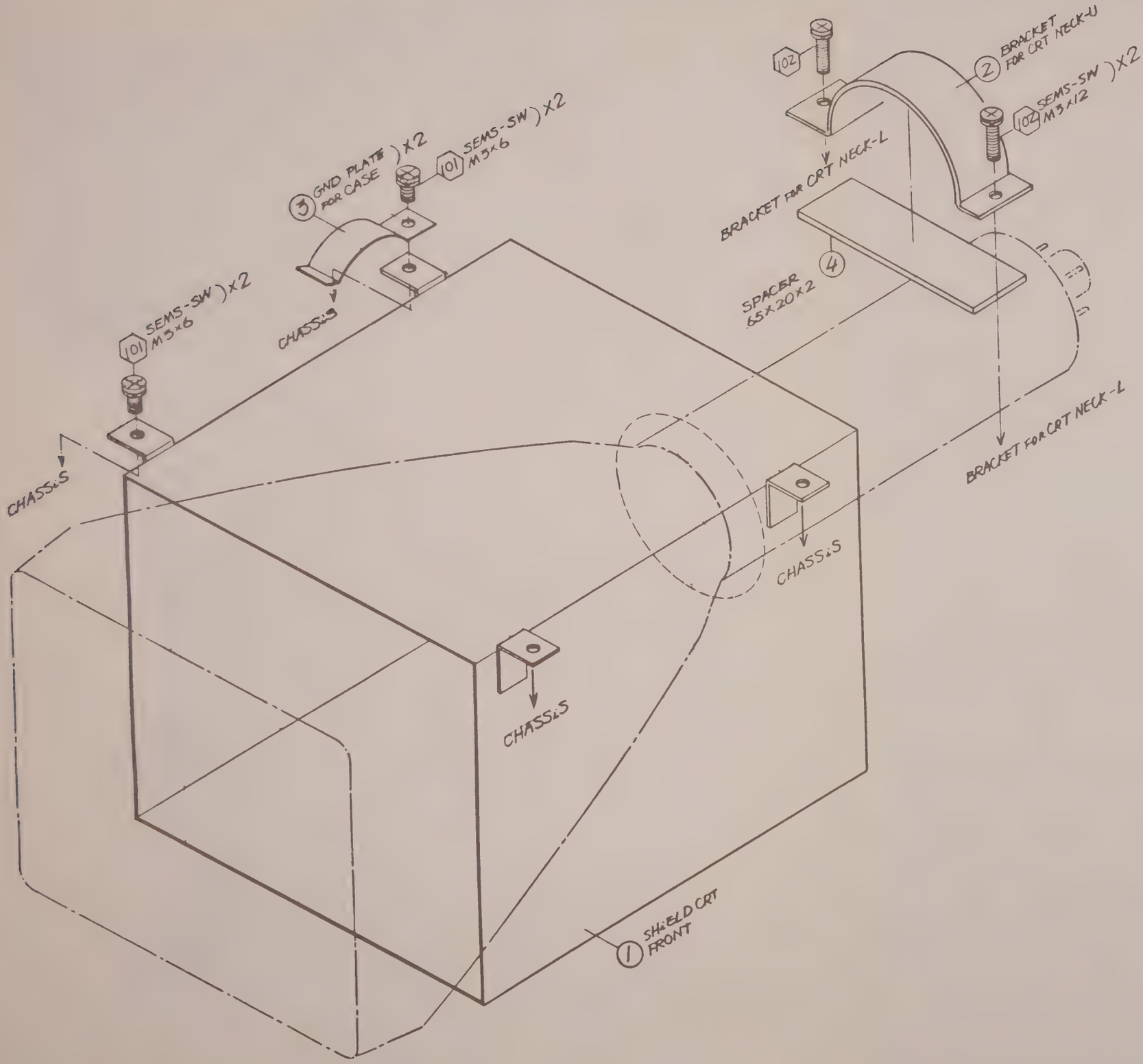
NO	NAME	QTY	CODE NO
114			
113			
112	WASHER 4-PW 9-1	3	J5-000-001
111	WASHER 4G PW	6	M5-040-001
110	FLANGE NUT M4EN	8	M4-010-001
109	FLANGE NUT M3EN	4	M4-010-021
108	SEMS 3W M4×8	4	M3-041-271
107	SEMS 3W M4×6	4	M3-041-111
106	SEMS-PW M3×12 B-NI	2	M3-008-021
105	SEMS-PW 4G×8 B-NI	4	M4-008-021
104	SEMS PW M3×6 B-NI	3	M3-008-011
103	HARU SARA M3×8 B-NI	2	M2-002-061
102	SEMS PW M3×4 B-NI	3	M3-008-001
101	BLIND M3×6 B-NI	4	M2-000-391
NO	NAME	QTY	CODE NO

(104) are SEMS PW M3x 6.

16			
15	JLZA. BUSH. M3	5mm	P4-040-061
14	NEO SELL TAPE 25×90×4	1	R3-506-702
13	SPACER 65×20×2	1	R3-670-002
12	NEO SELL TAPE -L	3	R3-670-001
11	SPACER HEX 3-9	4	L3-031-021
10	SPACER HEX 3-6	4	L3-321-011
9	SPACER HEX 3-5	3	L3-320-061
8	SPACER HEX 3-6	3	L3-320-011
7	BRACKET FOR CAPACITOR	1	D3-670-006
6	BRACKET FOR CRT-L	1	D3-670-009
5	BRACKET FOR CRT-U	1	D3-670-008
4	BRACKET FOR CRT NECK-L	1	D3-670-007
3	SHIELD PLATE	1	C9-670-002
2	SHIELD CASE	1	C8-670-003
1	CHASSIS	1	C9-670-004
NO	NAME	QTY	CODE NO.

110	NUT M3N	1	M4-311-091
109	SPRING W M3SW	7	M5-311-091
108	FLANGE N M3FN	6	M4-010-321
107	SEMS-SW M3×6	10	M5-311-211
106	SARA M3×6	5	M2-001-081
105	SARA M3×6	4	M2-301-081
104	BIND M3×6 B-Ni	1	M2-200-391
103	BIND M3×12 B-Ni	1	M2-000-111
102	BIND M3×10 B-Ni	1	M2 000-01
101	BIND M3×4 B-Ni	3	M2-300-071
NO.	NAME	QTY	CODE NO.

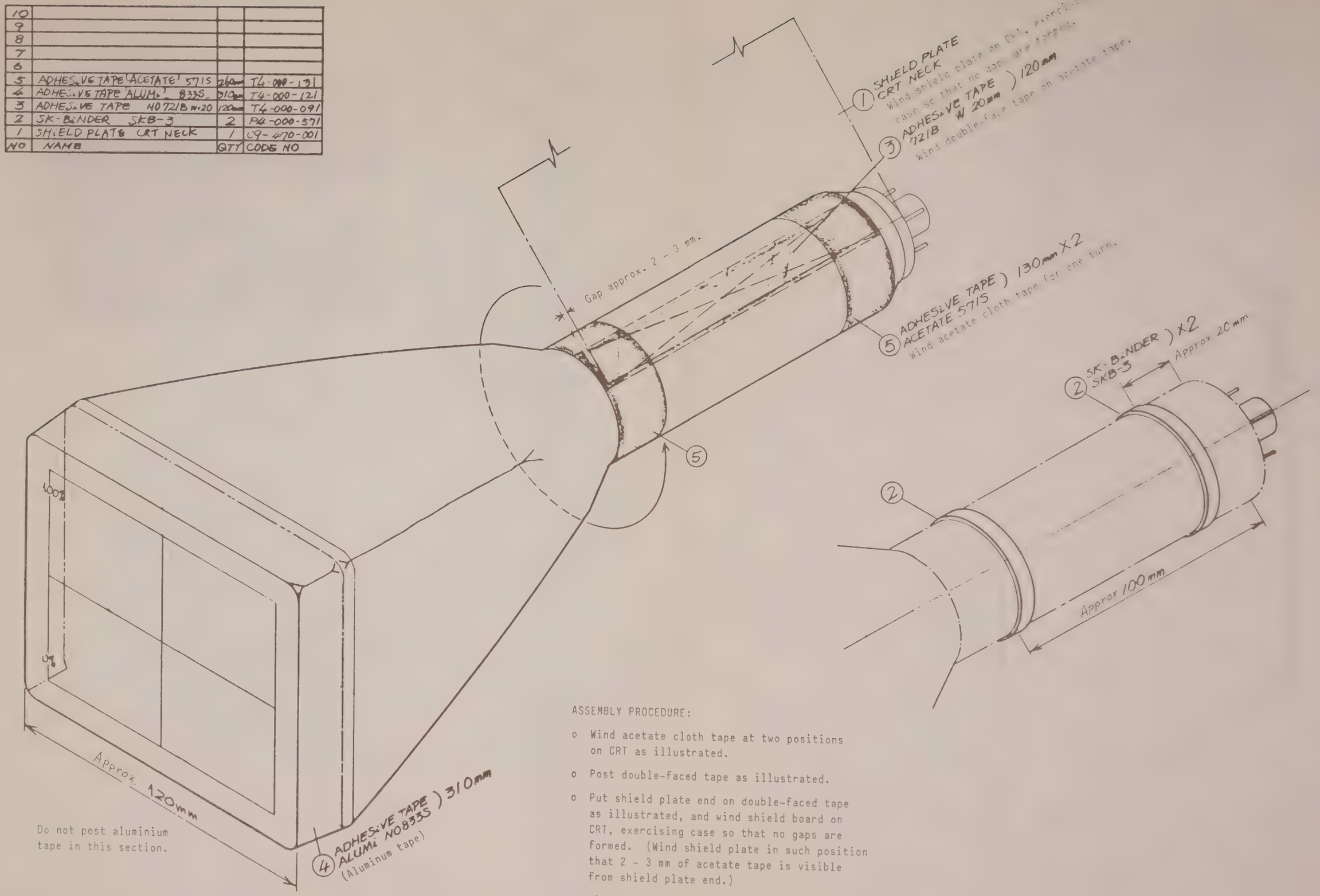
Note: Before installing, wind insulation tape (20 mm wide) one turn on the chemical capacitor at the section where it is contacted with the mounting bracket.



107			
106			
105			
104			
103			
102	SEMS-SW M3×12	2	M3-011-41
101	SEMS-SW M3×6	4	M3-011-011
NO.	NAME	QTY	CODE NO

7			
6			
5			
4	SPACER 65×20×2	1	R3-470-002
3	GND PLATE FOR CASE	2	E4-506-703
2	BRACKET FOR CRT NECK-U	1	03-470-006
1	SHIELD CRT FRONT	1	C8-470-002
NO.	NAME	QTY	CODE NO

NO	NAME	QTY	CODE NO
10			
9			
8			
7			
6			
5	ADHESIVE TAPE 'ACETATE' 571S	260mm	T4-000-131
4	ADHESIVE TAPE 'ALUMI' 0833S	310mm	T4-000-121
3	ADHESIVE TAPE NO 721B W:20	120mm	T4-000-091
2	SK-BINDER SKB-3	2	P4-000-571
1	SHIELD PLATE CRT NECK	1	C9-470-001

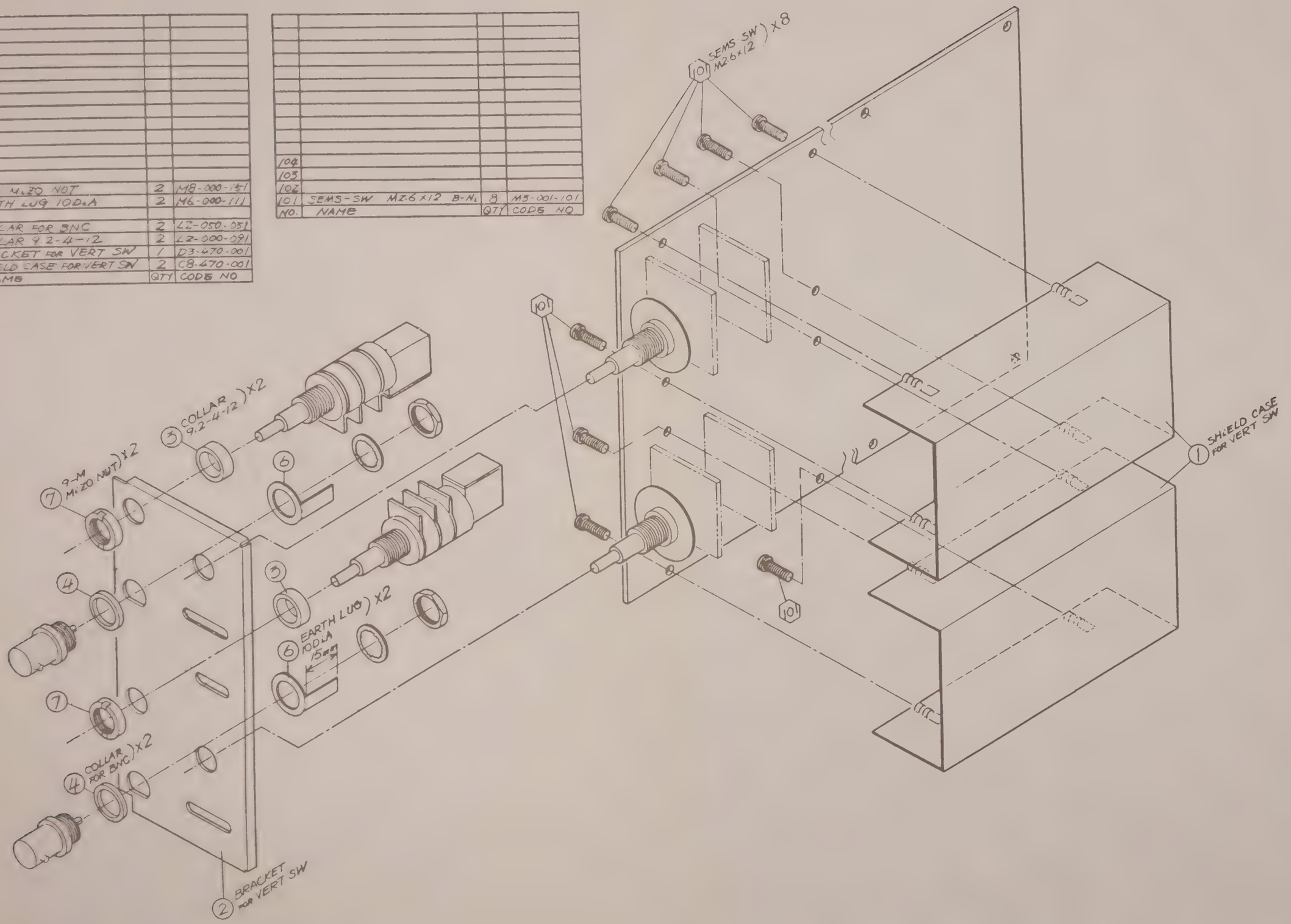

1 SHIELD PLATE CRT NECK
Wind shield plate on CRT, exercising case so that no gaps are formed.
3 ADHESIVE TAPE 721B W 20mm) 120mm
Wind double-faced tape on acetate tape.
Gap approx. 2 - 3 mm.
5 ADHESIVE TAPE ACETATE 571S) 130mm X2
Wind acetate cloth tape for one turn.
2 SK-BINDER SKB-3) X2
Approx 20mm
Approx 100mm
100
5
Approx. 120mm
4 ADHESIVE TAPE ALUMI NO833S) 310mm
(Aluminum tape)
Do not post aluminium tape in this section.

ASSEMBLY PROCEDURE:

- Wind acetate cloth tape at two positions on CRT as illustrated.
- Post double-faced tape as illustrated.
- Put shield plate end on double-faced tape as illustrated, and wind shield board on CRT, exercising case so that no gaps are formed. (Wind shield plate in such position that 2 - 3 mm of acetate tape is visible from shield plate end.)
- Clamp shield plate with SK binder as illustrated.

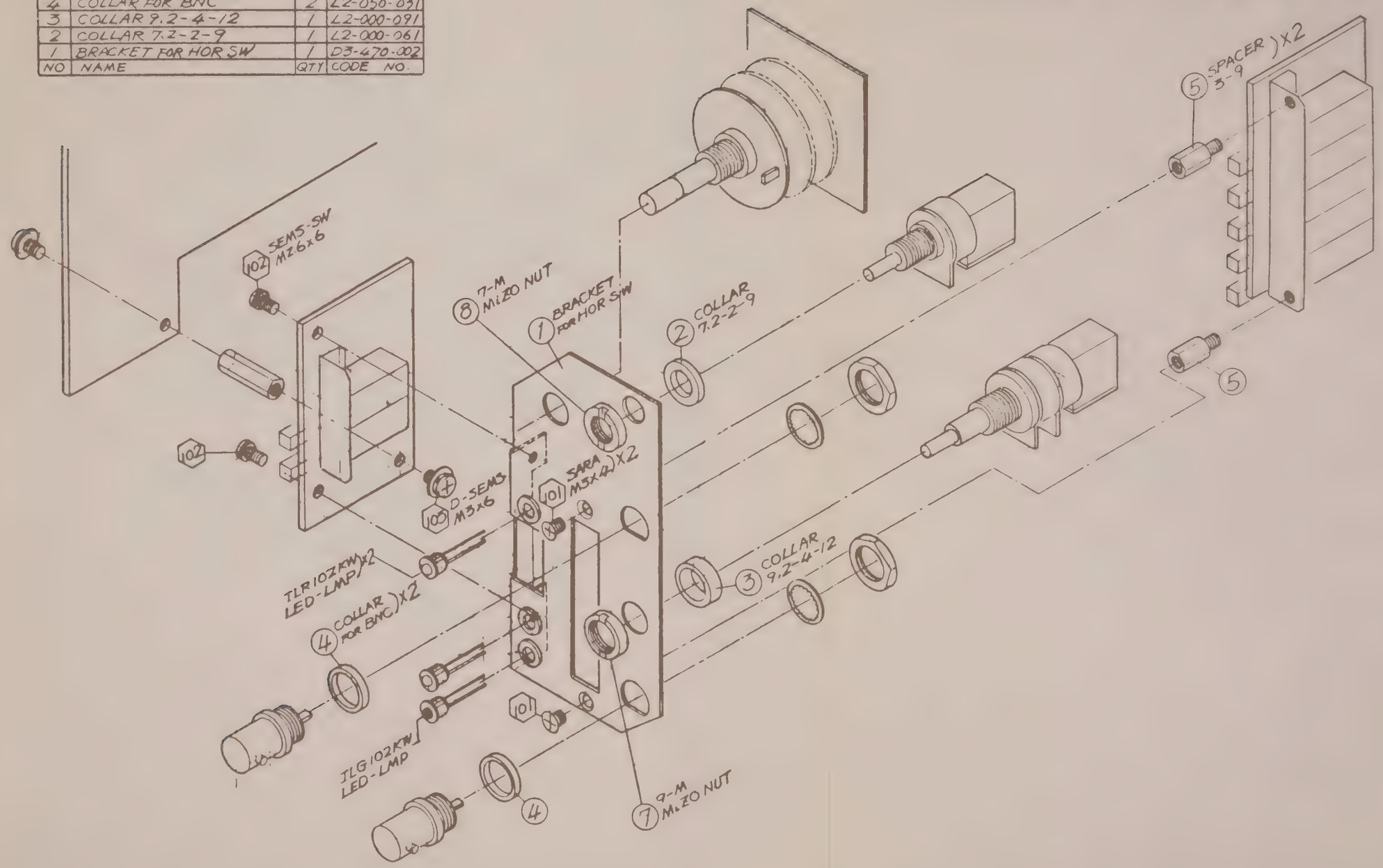
NO.	NAME	QTY	CODE NO
10			
9			
8			
7	9-M M4.2O NUT	2	M8-000-151
6	EARTH LUG 10D.A	2	M6-000-111
4	COLLAR FOR BNC	2	L2-050-051
3	COLLAR 9.2-4-12	2	L2-000-091
2	BRACKET FOR VERT SW	1	D3-470-001
1	SHIELD CASE FOR VERT SW	2	C8-470-001
NO.	NAME	QTY	CODE NO

NO.	NAME	QTY	CODE NO
104			
103			
102			
101	SEMS-SW M2.6×12 B-Ni	8	M3-001-101



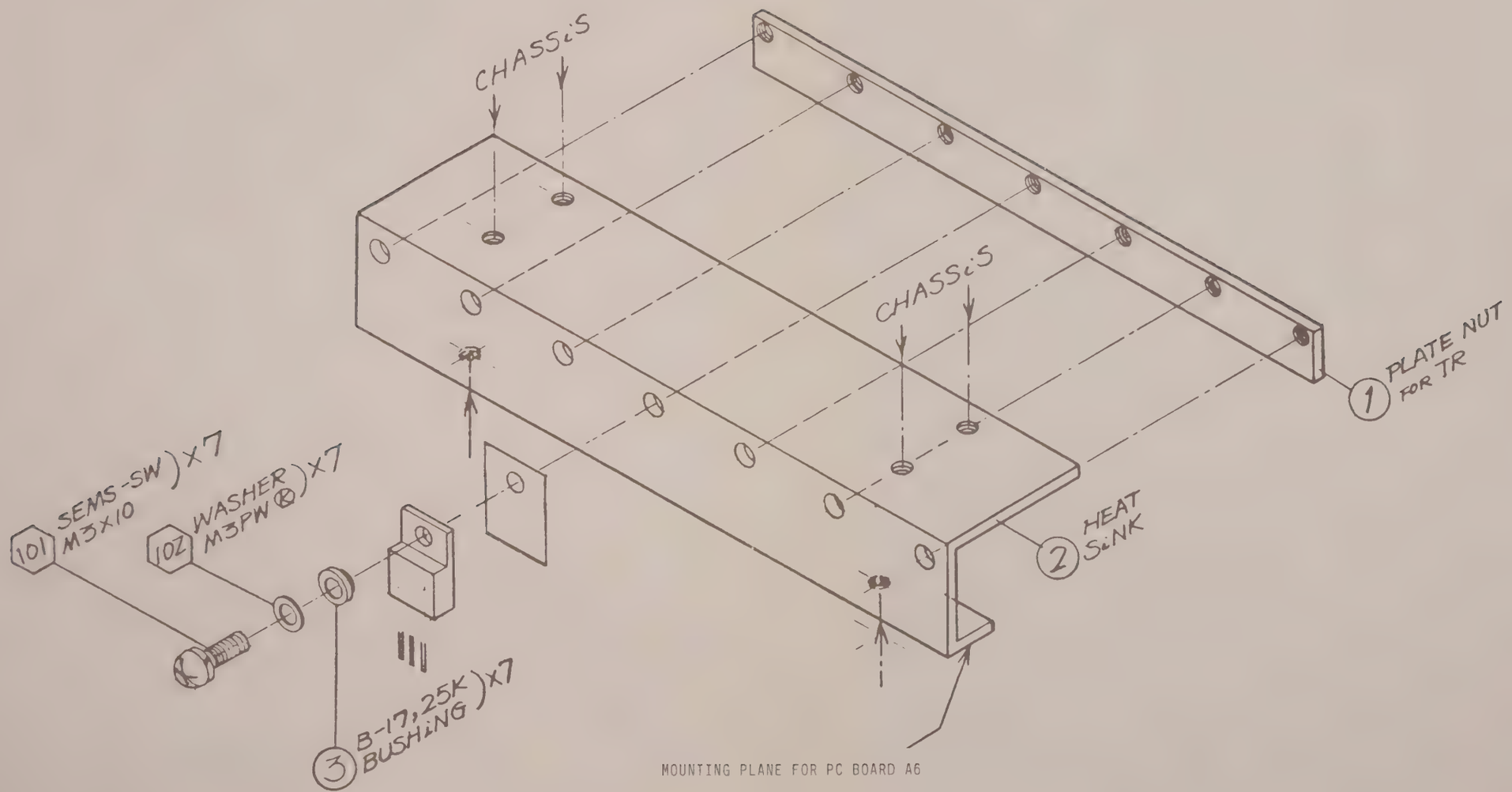
10			
9			
8	7-M M1.20 NUT	1	M8-000-361
7	9-M M1.80 NUT	1	M8-000-151
6			
5	SPACER 3-9	2	L3-021-021
4	COLLAR FOR BNC	2	L2-050-031
3	COLLAR 9.2-4-12	1	L2-000-091
2	COLLAR 7.2-2-9	1	L2-000-061
1	BRACKET FOR HOR SW	1	D3-470-002
NO	NAME	QTY	CODE NO.

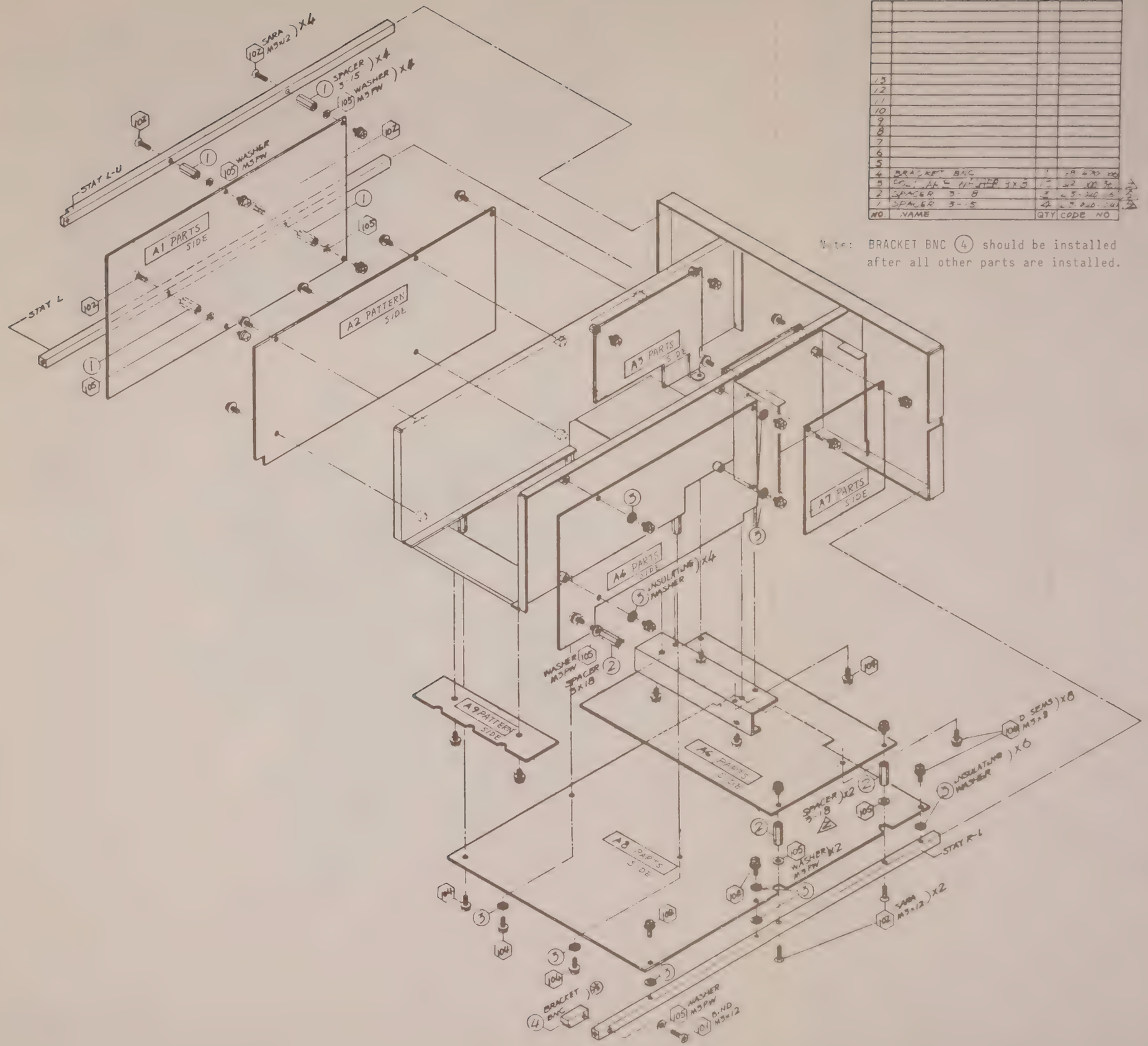
103	D-SEMS M3×6	1	M3-012-011
102	SEMS-SW M2.6×6	2	M3-011-121
101	SARA M3×4	2	M2-001-071
NO.	NAME	QTY	CODE NO.



7			
6			
5			
4			
3	B-17.25K BUSHING	7	Q2-000-231
2	HEAT SINK	1	H1-470-001
1	PLATE NUT FOR TR	1	D3-470-013
NO.	NAME	QTY	CODE NO.

107			
106			
105			
104			
103			
102	WASHER M3PW ®	7	M5-000-091
101	SEMS-SW M3×10	7	M3-011-031
NO.	NAME.	QTY	CODE NO.



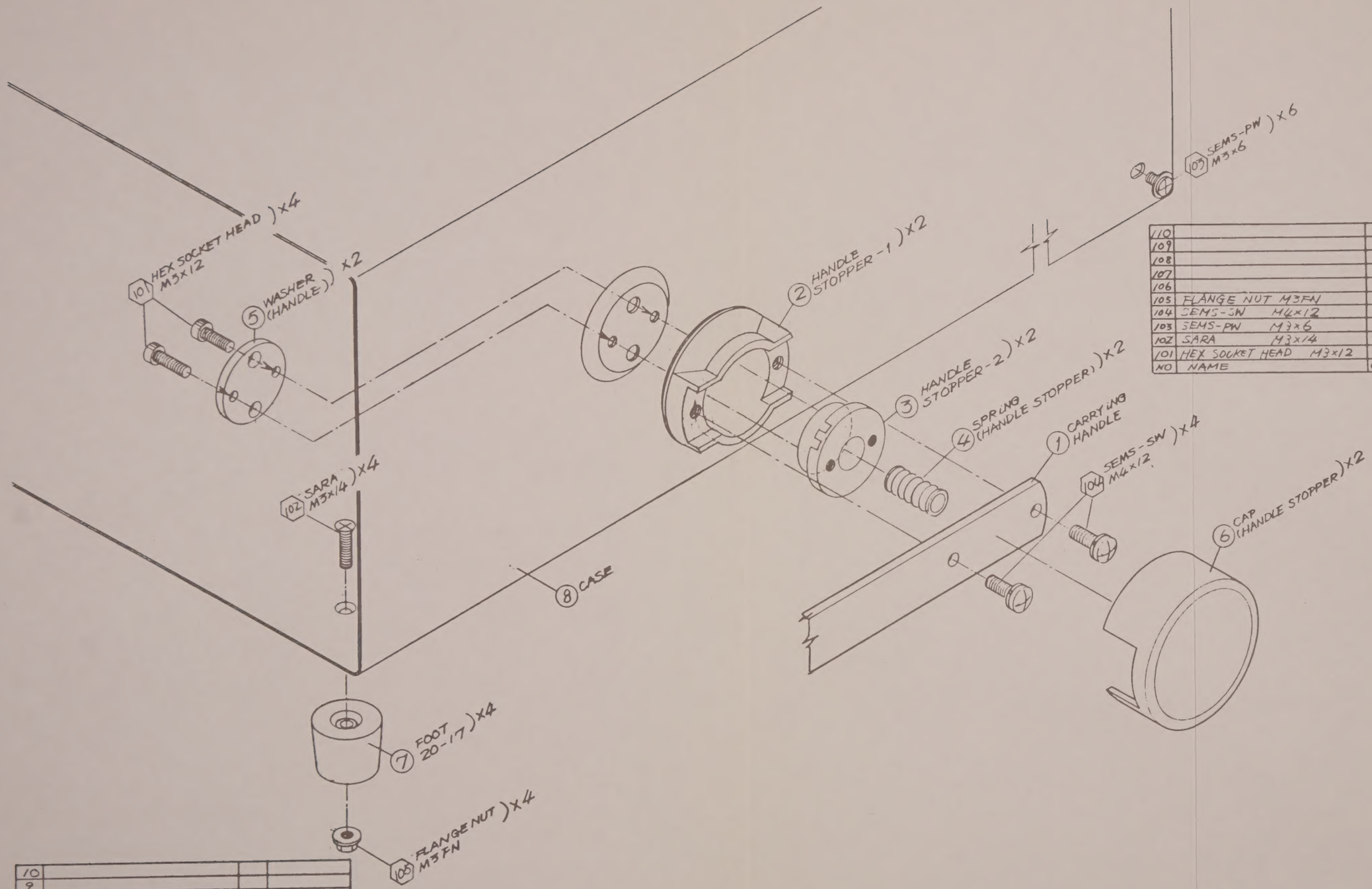


NO	NAME	QTY	CODE NO
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	BRACKET BNC	1	[illegible]
3	[illegible]	1	[illegible]
2	SPACER 3-8	2	[illegible]
1	SPACER 3-15	4	[illegible]

Note: BRACKET BNC (4) should be installed after all other parts are installed.

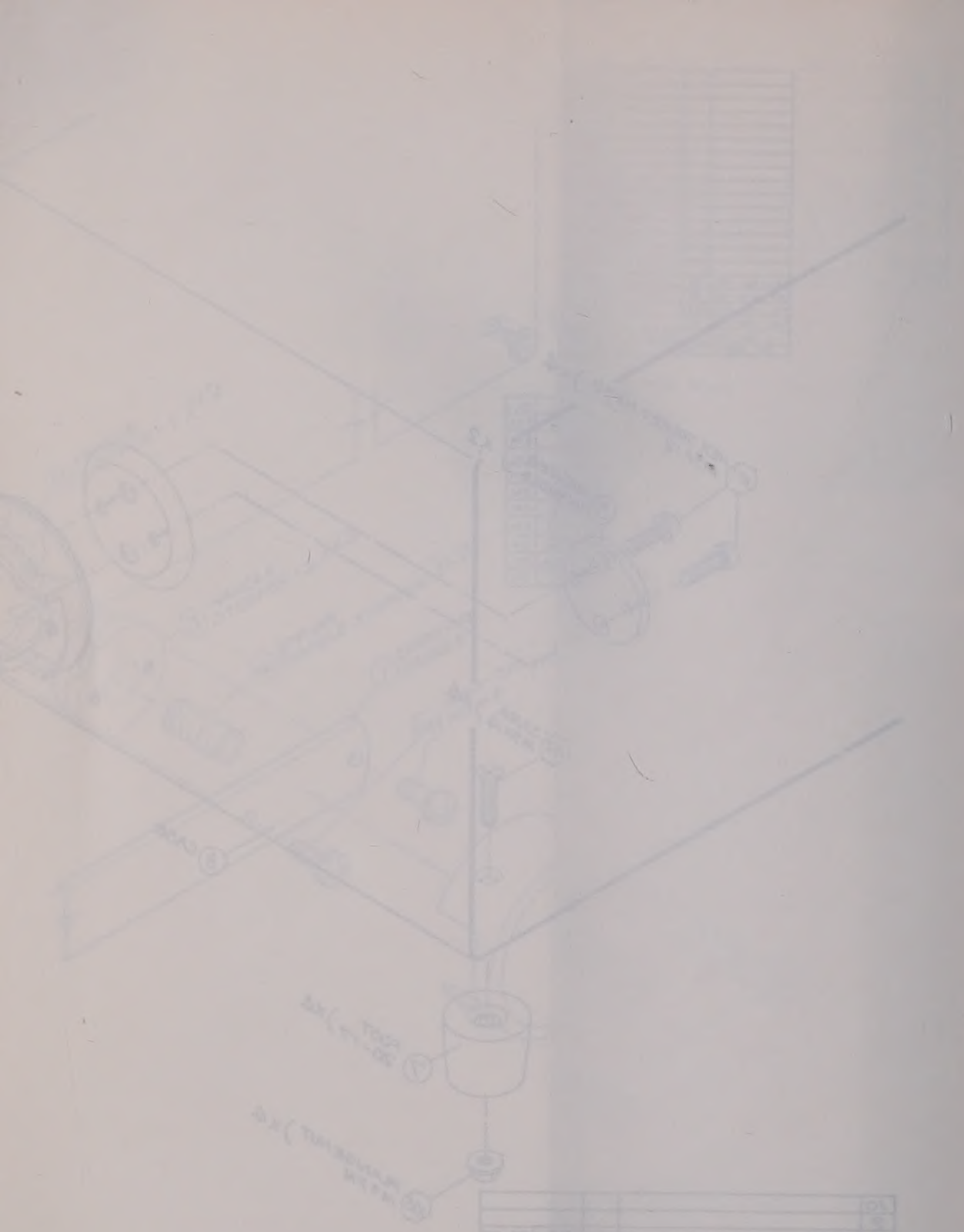
NO	NAME	QTY	CODE NO
111			
110			
109			
108			
107			
106			
105	WASHER M3PW	8	MS 210-221
104	D-SEMS M3x8	8	M3-042-221
103	D-SEMS M3x6	26	M3 042-[illegible]
102	SARA M3x12	6	M2 001-[illegible]
101	B-ND M3x12	[illegible]	M3 x00 11

The screws are D-SEMS M3x6.


(101) HEX SOCKET HEAD M3×12) ×4
(5) WASHER (HANDLE)) ×2
(2) HANDLE STOPPER-1) ×2
(3) HANDLE STOPPER-2) ×2
(4) SPRING (HANDLE STOPPER)) ×2
(1) CARRYING HANDLE
(103) SEMS-PW M3×6) ×6
(104) SEMS-SW M4×12) ×4
(6) CAP (HANDLE STOPPER)) ×2
(102) SARA M3×14) ×4
(8) CASE
(7) FOOT 20-17) ×4
(105) FLANGE NUT M3FN) ×4

110			
109			
108			
107			
106			
105	FLANGE NUT M3FN	4	M4-010-021
104	SEMS-SW M4×12	4	M3-011-091
103	SEMS-PW M3×6	6	M3-000-011
102	SARA M3×14	4	M2-001-391
101	HEX SOCKET HEAD M3×12	4	M1-001-181
NO	NAME	QTY	CODE NO

10			
9			
8	CASE	1	B2-470-00[illegible]
7	FOOT 20-17	4	P2-000-381
6	CAP(HANDLE STOPPER)	2	P1-050-011
5	WASHER (HANDLE)	2	M8-050-191
4	SPRING (HANDLE)	2	L5-050-011
3	HANDLE STOPPER-2	2	E6-050-071
2	HANDLE STOPPER-1	2	E6-050-061
1	CARRING HANDLE	1	E6-050-052
NO.	NAME	QTY	CODE NO.



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All instruments sold by KIKUSUI INTERNATIONAL CORPORATION are warranted to the original purchaser against defects in materials and workmanship from the date of original shipment to the purchaser within the following time limits:

Oscilloscope	—	2 year limited warranty
Power Supply	—	5 year limited warranty
Test Instrument	—	1 year limited warranty

However, this warranty excludes accessories, batteries, lead wires, and probes. Also, this warranty does not apply to any instruments determined by KIKUSUI INTERNATIONAL CORPORATION to have been subjected to customer alteration, modification, negligence or misuse.

In the event of any defects determined by KIKUSUI INTERNATIONAL CORPORATION to be covered by this warranty, KIKUSUI INTERNATIONAL CORPORATION will, at its sole option, repair or replace the defective instrument without charge and at its expense reship anywhere in the United States. To obtain warranty service, the defective instrument must be returned within thirty (30) days after the expiration of the applicable warranty period to KIKUSUI INTERNATIONAL CORPORATION or an Authorized Warranty Repair Station, properly packaged and with transportation and insurance prepaid. This warranty is valid only in the United States of America. Any customers of KIKUSUI INTERNATIONAL CORPORATION located outside of the United States should check with their nearest Authorized Agent for warranty information applicable to them.

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Kikusui International Corp.
17819 S. Figueroa St., Gardena, Ca. 90248 · (213) 515-6432 · TWX910-346-7648 KIKUSUI GDNA

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